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The American Botanist

Devoted to Economic and Ecological Botany.

EDITED BY WILLARD N. CLUTE.

Volume II.

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CONTENTS.

Contributed Articles.

Botanical Society, A New 87
Eccentricities, Floral ..... *A. A. Field*, 33
Fascination ..... *Prof. W. W. Bailey*, 81
Flower-folk, Arizona ..... *A. A. Field*, 1
Flowers of the English Waysides ..... *C. F. Saunders*, 17
Flowers, Some April ..... *Prof. W. W. Bailey*, 66
Mandrake, The ..... *Bessie L. Putnam*, 82
Native Wild-flowers, Elements Destructive to, *Frank A. Suter*, 3
Notes from Ohio ..... *Almon N. Rood*, 49
Pike's Peak, The Flowers of ..... *Mrs. S. B. Walker*, 20
Plant Misnomers ..... *C. F. Saunders*, 65
Southern Spring, The Beginning of a ..... *Willard N. Clute*, 21
Spring in the South ..... *Willard N. Clute*, 50

Reprinted Articles.

Cacti, Some Californian 5
Desert and Alpine Plants, Survival of 36
Double Flowers, Origin of 35
Epiphytes 84
Ferment Action in Plants 55
Flowers, Extracting Perfumes from 40
Flowers, Insect-catching 68
Ginseng Hunter, The 88
Grass Seed, A Gigantic 74
Honeysuckles, The Blooming of the 23
Mandrake, The Mysterious 38
Mushroom Folk-lore 74
Orchids and their Insect Sponsors 39
Paper Mulberry, Uses of the 54
Persimmon, The 11
Plant Names 41
Plant Partnerships 8
Plants, Self-preservation in 28

Pollen, Influence of, on the Mother Plant..... 72
Redwood and Fog, The..... 26
Wild Garden, The..... 69

Note and Comment.

Abrus Precatorius..... 58
Alkaloid, Mankind's Craving for 13
American Trees in Europe..... 42
Antiseptics, Perfumes as..... 43
Botanical Club, Vermont..... 12
Botanical Studies, Value of..... 44
Botanical Terms, New..... 59
Botanist Defined, A..... 89
Botany, Value of..... 77
Buckthorn, Origin of the Name... 89
Button-bush, Distribution of the 12
Camphor Tree, The..... 58
Cascara Sagrada..... 12
Chewing Gum, Natural..... 43
Cinnamon Fern Fruiting in Autumn..... 44
Cosmos, To Grow..... 12
Daisy, Shasta..... 90
Daisy, The Barberton..... 44
Dandelion, The Southern..... 90
Dodder, Host Plants of the..... 91
Erythronium, Common Names of 91
Flora of Ohio, Non-indigenous.... 29
Flowers, Uses of Ether in Forcing 91
Fringed Gentian, Disappearance of the..... 13
Fruits, How Certain Ripen..... 78
Gentian, The Fringed..... 43
Hart's-tongue in England, The... 12
Horse-chestnuts as Food..... 42
Individual Blossoms, Prolonging the Life of..... 59
Mango, Origin of the No. 11..... 29
McDonald, Wm. H., Death of..... 89
Moss, A Luminous..... 77
Orris Root..... 90
Oxalis Leaves, Rooting of..... 28
Peanut, Uses of the..... 13
Pecan, Variation in the..... 57
Plant Protection, Sentiment and 90
Plant Protection Societies, Two 76
Plants, Composition of..... 90
Plants of Mt. Ranier..... 12
Potatoes, Origin of..... 92
Prickley Pear in Australia, The... 58
Rhus, The Poisonous Principle in 93
Roses, Otto of..... 76
Seeds, Germination of..... 77
Seeds, Vitality of..... 42
Sensitive Plant and Ether, The... 89
Tropical Plants in Florida..... 45
Tuber-bearing Labiate, A Western..... 76
Tubers in the Labiatæ, Production of..... 42
Weed Laws..... 75
Wild Flowers in England, Protection of..... 75
Woody Plants, Self Pruning in.... 44
Ylang-Ylang, Attar of..... 76

Editorial.....14, 30, 46, 62, 78, 94
Books and Writers.....15, 31, 47, 63, 79, 95

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FOR THE PLANT LOVER

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THE AMERICAN BOTANIST

VOL. II. JANUARY 15, 1902. NO. 1

ARIZONA FLOWER FOLK.

BY A. A. FIELD.

An interesting section for exploration, particularly to one interested in plant life, is the territory north of the Santa Fe Railroad, where it runs through Arizona. Crossing the foothills of the Pinal mountains one is at an elevation of from six to seven thousand feet, yet here one runs across a world of interesting bloom, though many of the flowers are the same as those we find in the Eastern gardens. However, there is enough of unusual varieties to make a botanical research interesting technically and artistically.

There is a marked gregariousness among the flowers as well as among the birds of this section, almost all sorts and conditions growing in colonies as it were. It was in one of the cool nooks bordering a refreshing mountain stream that I chanced upon a little gathering of columbines, the rarer variety *Aquilegia flavi-flora* which we sometimes see in gardens. It is by far the handsomest and most luxuriant member of the family with its rich yellow bloom, though the old legend of the doves drinking from a nectarie of sweets, which some thought this flower resembled, would in this flower have to change its feathered representatives to swans, so slender and long are its graceful spurred petals. Here, too, one runs across a member of the hair-bell family, generally *Campanula rotundifolia,* much lighter in color than in Montana and the cooler regions where its rank growth makes the way almost impassible, and when in bloom the earth rivals the deepest of summer skies in rich color, and one seems to literally walk in heavenly blues. A bit lower down on one of the mesas blooms worlds of the scarlet gilia (*Gilia attenuata*), the flowers of which greatly resemble the tree cypress, and one is dazzled by its

brilliancy which looms up like a great scarlet blanket thrown across the foothills. I also found a few blossoms of the American colombo (*Frasera speciosa*), with its small purplish flowers, but with which I was not at all acquainted. Near the mountain rivulet grew some greenish flowered umbrellawort (*Oxybaphus angustifolius*), neither pretty nor interesting. Lower down I found many plants of the stemless loco-weed (*Oxytropis Lamberti*) which is said to drive horses insane if eaten by them. A smooth beard-tongue (*Pentstemon Torreyi*) I think, grew here luxuriantly, as also did the wild arnica which in its season literally covers the foothills, casting over them a sheen of that gold for which many a poor prospector has sought in vain, and lost his life in consequence amid these trackless mountains.

Another of our Ohio flowers flourished well on the same foothill, and that is the verbena, which cultivation has greatly improved. This western variety is the small flowered purple, *Verbena bipinnatifida.* A rather rare find were some prickly poppies, which open their great white flowers, nearly as large as a saucer, after the sun has passed far toward its setting. I have found them growing rankly upon a pile of rocks where there seemed positively no sustenance whatever. I think this member of the poppy family is probably *Argemone alba,* but its relative, the California poppy, which blooms in Gila County early and late and hides not its glowing face from the sun, is much more in evidence. Speaking of yellow bloom, it is perhaps too visionary to suggest that the hidden gold of the mountains is reflected in these flower faces on the surface of the earth, but nowhere did I ever see such profusion of yellows as cover the foothills of Arizona. Between the flowers and the sunlight one gets literally steeped in glittering gold. The yellows that are the most profuse bloomers are the prairie zinnias (*Zinnia grandiflora*), the arnicas, the mustards, the poppies, two or three varieties of yellow cacti, though these are more of a lemon yellow, the golden portulacas and another yellow flower, *Riddellia tagetina,* which looks like the garden catchfly and has, I believe, no common name. But all color waves have their day in this sunny region, for when it is not a

world of yellow, it is a world of red or blue. A most profuse bloomer is the wild lupine (*Lupinus pusillus*), as is also the blue larkspur, which takes on a much richer color than our eastern flower.

All of these gay flowers are prodigal of their bloom after the rainy season, but one is forced to add that it is sometimes two years between showers, a bit discouraging to the members of the floral kingdom, save the cacti and plants located near the mountain springs. There is a handsome red mallow (*Malvastrum coccineum*) that grows on the mountain side, small and clustering like the verbenas, in which family I should place it if not contradicted by specialists who are so ready to disturb and distrust general conclusions. Another red flower is a kind of painted cup, *Castilleja indiversa,* with lots of green in its make up, and these with the gilia and red portulaca, gives the hills a vermillion haze in their season. But nothing can out-rival the scarlet of the red cactus bloom, small flowered but profuse. A mass of crimson seen by a party of us one day while riding over a mountain trail, created confusion in our ranks, for our guide at first took it for a scarlet Indian blanket, out of which might develop an Indian, and if one Indian, more Indian; under the circumstances not a very desirable contretemps.

ELEMENTS DESTRUCTIVE TO OUR NATIVE WILD FLOWERS.

By Frank A. Suter.

The principal element destructive to our native flora has existed for over three hundred years, and begins with the advent of civilization upon the American Continent. The destruction caused by the extensive removal of wood-lands, and their subsequent cultivation is probably greatest of all. Plants thus driven from their environment are obliged to seek other habitats or perish. As a result, many of our native plants have become localized and dependent upon the protection of some indulgent landowner. How often must we learn that some favorite haunt of our childhood days, where we used to hunt the hepatica or the shooting star, is about to be turned into cultivation, or that some

botanical resort is to be drained and put under the plow. Such a course means the certain destruction of the plants in that particular place.

But civilization, in itself an unavoidable and excusable agent, is responsible for a destructive force equally potent. It is generally admitted that the flora of Europe is of more recent origin; newer and therefore more highly developed and capable of adaptability to a greater extent, than its more beautiful American rival. From the time of the discovery of America and the influx of the colonists, the importation of grains and vegetable seeds from Europe has been the means of transplanting into the American soil, many new species of European plants, and, unfortunately, many of its most obnoxious weeds as well. Because of their greater adaptability, the plants thus introduced from Europe, from small beginnings, have spread until some of them are now numbered among the most widely diffused plants in the United States. The dandelion and shepherd's purse, both of European introduction, are typical examples. What native plant possesses means of seed distribution equal to that of the dandelion? Or what native weed, if there be such, can maintain an existence in field and street, upon deserted ash heap, or by the trodden wayside, like the sturdy shepherd's purse. The Canada thistle, the troublesome docks, the Jamestown weed, and many others of foreign origin, survive because of their superior adaptability to their environment. And yet there would be no possible conflict, if these plants did not outgrow the limits of civilization. Like the English sparrow, in its encroachments upon our native birds, these plants do not confine themselves to the city and town, but have found their way into the fields and woodlands; yes, even into the most secluded haunt, daring to grow side by side with the delicate orchid, thriving, spreading, increasing until the native plants are suppressed and die.

Although the destruction due to these elements is, in a great measure, unavoidable, there still remains a destructive agent, which can and should be avoided, and is therefore inexcusable. I refer to the ruthless destruction of our choicest American beauties

for the sake of fashion, selfishness, or the thoughtless plunder of speamens in the so-called interest of science. In the first respect, probably no flower suffers more extensively than that loveliest of all early spring flowers, the trailing arbutus. Its beautiful, fragrant blossoms sell for good prices in the cities, while the growing scarcity with the increased demand make profitable an industry, which will eventually exterminate the species. The azaleas, laurels, and the holly are, in their seasons, subjected to similar depredation. The spring beauties, shooting stars, adder's tongues, wood violets, columbines, anemones and bloodroots are the prey of the many May-parties which are thoughtlessly robbing the wooded hills along our streams. The inexperienced students of Botany are also often guilty of injudicious gathering of specimens. It is sad to see a crowd of high school pupils turned loose upon a patch of bellwort or wood anemone, or others of our rarer species. Unaware of the harm they are doing, without the caution or advice of teachers, oftentimes, how can we blame them? But the careless destruction of plants is a fault confined not alone to the elementary and inexperienced students, for it is common to many botanical collectors and professional plant gatherers, who are or should be, aware of the danger of extermination, which they are helping increase,—a danger which all true botanists and plant lovers are seeking to prevent.

SOME CALIFORNIA CACTI.

There is, perhaps, no State in the Union blessed with so varied a flora as is California, and of this flora there is no section so interesting, yet withal so deceiving, as the cacti of our arid lands. I say "deceiving" advisedly, as many a tourist who has innocently attempted to pluck the delicious-looking fruit of the "tuna" will voluntarily testify. But his fear and dislike of them, given forth from his seat on the "overland" in the form of a wearied exclamation, "More sand and cactus!" will probably change, before he (or she) leaves for his Eastern home, into a positive mania for collecting these peculiar plants, crowned as they are with beautiful waxy blossoms of varied hue.

When it is known that there are extant over seven hundred species of cacti, the folly of any attempt, in the scope of so brief an article as this, to give a list even of the families, must be at once apparent. My only effort, then, shall be to give a brief idea of the more common of our wild forms, which are to be met with almost from seashore to mountain top.

According to the best authorities, the cactus was unknown to the Old World prior to the discovery of America by Columbus, though now it is as plentiful along the shores of the Mediterranean and in other arid portions of Asia and Africa as it ever was in our own deserts. Like camels, ostriches and other forms of desert life, the cactus has developed within itself—by means of its fleshy leaves—a perfect storehouse of nutriment, capable of withstanding the rigors of drought from one rainy season to another.

What we call the "leaves" of the cactus in reality correspond to the trunk and branches of other shrubs, while the leaves themselves have been retarded until they are degenerated into the spines and thorns which prick us when we attempt any undue familiarity.

All plants grown in arid places tend to develop very thick, succulent stems, having little or no leaves, but a very thick skin to prevent the absorption of their life juices by evaporation. A very good instance of this is to be found in the common "ice plant" which grows so thickly along our beaches, just above high-water mark.

Further, as every plant must absorb its carbon from the air in the form of a gas, it follows that plants of this class tend to present the greatest possible expanse of surface to that air, and, on the other hand, have widely-spreading roots, set shallow in the ground, so as to get the greatest possible amount of nutriment and moisture from the earth. Lastly, as a super-fine product of the evolution of a species, we note that the cactus presents (as I have said before) its true leaves in the form of spines for the sole purpose of protecting itself from such animals as, wandering in desert regions, would seek to eat it. Some cultivated forms of cacti

have no spines—or, merely rudimentary ones—they being unnecessary, owing to the protection of the plant itself by man.

Very properly, moreover, the cacti have developed into wonderfully prolific forms. So much so that even a small section of a "leaf" will, if planted, take root and produce another plant of the same kind. Many forms have most beautiful blossoms. Take, for instance, the night-blooming cereus, which is a cactus, pure and simple, and a close relative of the ungainly giant cactus of Arizona deserts. Some of these latter attain to a height of more than fifty feet, a diameter of two or three feet, and are covered the whole way with myraids of poisonous spines or thorns.

Of the species indigenous to Los Angeles county, all are relatively small in size, but none the less interesting and beautiful. The most plentiful of all our forms is the "prickly pear," a species of tuna known to botanists as one of the Opuntias—a large group of flat-lobed cacti. The fruit of this is commonly eaten by Indians, children, birds and even some forms of quadrupeds, such as skunks, ground squirrels, etc. In some parts of the Southwest this cactus is fed to cattle in time of drought, the spines being first removed by burning. Southern California could as well afford to lose her missions as her huge beds of this cactus. In fact, to me, at least, the beauty of an old Spanish abode is doubled by the presence of the usual clump of cactus, crowned with vari-colored blossoms or dark-purple fruit; as the season may be. About many of these old haciendas cacti (mostly of this variety) were planted as hedges, while to this day delicious preserves and jellies are made from its fruit by the older Mexican women.

The "rainbow" cactus, so called on account of the varied and brilliant colorings of its spines, is found in the dry washes of our canons. This plant is globular in form, covered with spines, and bearing a profusion of large crimson flowers. It is a species frequently seen in eastern hothouses, but should not be confused with the "old-man" cactus, which does not, to my knowledge, grow wild in Los Angeles county.

The Cholla, or cane cactus, bears about the same relation to the traveler in Southern California that the "wait-a-bit" thorn

does in South Africa. Its spines seem rather more poisonous than those of other species, and there is a popular belief—based on the elasticity of the stem of this plant—that it leaps forward to meet the unwary person who approaches too near to its place of growth. It, too, bears a beautiful yellow blossom, though, in common with the flowers of most other cacti, it has an unpleasant odor. From its stem, when the fiber is dry and hardened, handsome canes are made. Its fruit amounts to little or nothing, being too small and filled with seeds to furnish food for anything.

The flowers of our cacti are as variable as the plants themselves, while their coloring ranges from the purest white to deep crimson, the intermediate shades being the most delicate found in any known flowers. These flowers produce immense quantities of pollen and bees and other like insects gather in numbers on cactus beds to collect this food.—*Harry H. Dunn, in Los Angeles Times.*

PLANT PARTNERSHIPS.

A true parasite draws its nourishment wholly from the plant to which it has attached itself, giving no return except the ungrateful one of injuring or killing its host. A true saprophyte is supposed to live wholly upon humus or decayed vegetable matter. A true symbiot is a plant which has formed a partnership with another plant or plants; a partnership of such a nature that the benefits are mutual. Now it so happens that there is a striking resemblance in habit between certain members of these three classes of organotopic or dependent plants. Certain root-parasites, certain saprophytes, and certain symbiots are, in fact, so similar in appearance that it is not strange they have until lately been placed in the same category. Superficially, beech drops and coral root and Indian pipe appear to be nearly identical in habit. It has remained for that little detective, the microscope, to demonstrate that they are entirely different in their relations to the plant world and in their mode of obtaining subsistence. The first, beech drops, is a true parasite, and, like the lower fungi, subsists entirely upon its host; the second, coral-root, so far as present knowledge goes, lives, like the fleshy fungi, on decayed vegetable matter, and may therefore

be considered a true saprophyte; the third, Indian pipe, until recently regarded as truly parasitic in its mode of living, has been proved to be a true symbiot. If parasitic at all, Indian pipe should be a root-parasite, but it has been proved that its roots have no connection whatever with the roots of other plants. Careful investigation has also shown conclusively that it does not subsist on decomposed vegetable matter; therefore, it cannot be a saprophyte. How then does it beg, borrow or steal its nourishment? It has been demonstrated that Indian pipe is a true symbiot, "being in its existence closely bound up with that of another plant which contributes to its necessities, but is equally benefited by this connection." The late Dr. Charles Mohr in the "Plant Life of Alabama," states the relation as follows: "Immediately after their germination the rootlets of these plants are infested by the vegetative threads or spawn (mycelium) of a fungus, which, as the plant develops, fastens itself upon every root, finally enveloping the rootstalk in a thick film, the higher plant drawing its nourishment solely from the elaborated food of the fungus." Whether the fungus gains anything more than a favorable site for growth is a question. It may possibly receive strengthening juices from the hospitable root.

So here we have a very curious state of affairs. A flowering plant, belonging to the highest sub-kingdom in the world, has formed a partnership with a member of the lowest sub-kingdom! It has sold its birthright, the right to make chlorophyll and thereby assimilate its own food from the soil and the air, for a mess of pottage, and has thus enslaved itself to the lowest of the low. In their inflorescence and mode of reproduction Indian pipe (*Monotropa*) and false beech-drops (*Hypopitys*) are closely allied to the heath family (*Ericaceae*). It is now known that many members of this family are to a greater or less degree dependent on the association of fungi with their root systems, the fungi taking the place of root hairs. Therefore, it is highly probable that the members of the Indian pipe family are degraded members of the heath family, having carried their borrowing propensity to extremes. It appears that the root system in their case is wholly en-

veloped, and that all the materials of subsistence are contributed by the fungus.

Both Indian pipe and false beech-drops may be found in this vicinity, the former in almost any wood where leaf mold abounds, the latter usually under oak trees in rather dry woods. The white scapes and single nodding flowers of the Indian pipe are familiar to every one—the brownish, several-flowered scapes of the false beech-drops are less frequently seen.

As noted above, these two genera, *Monotropa* and *Hypopitys*, represent the extreme of symbiotism in flowering plants. But the inference must not be drawn that all plants which have their root systems infested with fungi are necessarily decadent. The fact is, almost all forest plants, whether trees, shrubs or herbs, receive more or less nourishment from humus, or vegetable mold, and are accordingly partial saprophytes. Many of them also receive the assistance of fungi, and are accordingly partial symbiots. Four large families of plants are now known to derive such assistance in the work of absorption. They are the pine, oak, birch and heath families. In them the work normally performed by root hairs is largely done by fungus hyphæ and strands. These not only partially envelop the root, but they also force themselves in between the cells of the tissue. A root thus infested has been called a fungus-root or mykorhiza.

It is evident that the story of the dependent plants thus far is a story of greater or less degradation. Even before the true status of parasites was known the decadent tendency was recognized and such plants were suposed to be degenerate outgrowths from their hosts. A remarkable thing about dependent plants is that they lose entirely the external appearance of a vascular plant and even the whole structure of tissues characteristic of vascular plants, and yet retain unchanged the parts concerned in reproduction. A single organ, or parts of organs, may indicate the downward tendency more positively than the rest of the plant. The haustoria by which parasites attach themselves to and draw nourishment from other plants are degraded roots. In hemiparasites some divisions of the root remain normal while others are degraded into haus-

toria. In bastard toadflax (*Comandra*) the roots produce globular haustoria which emit a process that penetrates the tissues of the host. It seems that degradation affects the vegetative much more quickly than the reproductive organs of plants; a fact of which the orchid family perhaps offers the best illustration. The coral-roots constitute a case in point.—*From an article by F. W. Bachelder in Nature Study.*

THE PERSIMMON.

Our old lane will probably yield us a persimmon tree or two, and it is pleasant to look up into the thinning leaves and see clinging to the limbs the round, fat persimmons, like rosy little puddings tied about the throat. There has hardly been frost enough yet to soften their asperities—at least, in the neighborhood of Philadelphia—and we shall do well to treat very gingerly the fruit we may now find upon the ground. Something of the old malicious spirit lingers in persimmons which was in that strange fruit, sardo, that grew anciently in Sardinia and so contorted the faces of those who ate it as to give them a look of unreal laughter and so to human speech the adjective sardonic.

Nevertheless, few wild fruits are so dear to the American heart as this, which with many of us is associated with wholesome country outings and good times, and has a special place in popular song and story. It may not be generally known that ebony is the wood of certain species of persimmon trees that grow in tropical regions. Our North American variety, while presenting in its heart-wood—which is dark and close-grained—some characteristic of the ebony of commerce, does not develop a timber of much value.—*C. F. Saunders in Philadelphia Record.*

NOTE AND COMMENT.

Wanted.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

CASCARA SAGRADA.—It is said that the drug Cascara, extensively written about in medical journals, is the bark of two American buckthorns—*Rhamnus Purshianus and R. Californicus.—Mechan's Monthly.*

DISTRIBUTION OF THE BUTTON-BUSH.—According to *Indian Gardening and Planting,* our familiar button-bush (*Cephalanthus occidentalis*) was last year discovered in India. Its occurrence in Assam and a few other portions of Asia had previously been known.

PLANTS OF MT. RANIER.—Those who are collecting the plants of the West may be interested in knowing that Mr. J. B. Flett, Tacoma, Wash., has several first-class sets of plants, collected on Mt. Ranier, and identified at Harvard University, which he offers for sale at a greatly reduced price.

TO GROW COSMOS.—Unfortunately for those in the Northern States who wish to grow this handsome autumn flower, the seasons are rather too short for it to come to perfection. It is possible, however, to make a very good show with it by planting very early in spring in the house and transplanting when the weather becomes mild enough.

VERMONT BOTANICAL CLUB.—At the seventh annual winter meeting of this club, to be held at Burlington, January 24th and 25th, Dr. B. L. Robinson of Harvard University will deliver an address on "Some Recent Advances in the Classification of the Flowering Plants." This club is doing much to advance the botanical interests of the State. Botanists in other sections might follow their example with advantage.

THE HART'S TONGUE IN ENGLAND.—The hart's tongue, which is so great a rarity in America, is one of the commonest ferns in England and sometimes grows there in very unexpected places. The writer of this paragraph saw a little tuft of it last summer ensconced in the chinks of a high wall along a street in the quaint old town of Warwick. It was just out of reach, but by means of two children and sixpence, the treasure was finally secured.—*S.*

MANKIND'S CRAVING FOR AN ALKALOID.—The notable fact that all substances wherever found which contain the alkaloid "theine"—it is the characteristic constituent not only of tea, but also of coffee, the mate and guarana of South America and the kola of Central Africa—are highly prized by the human race, would seem to prove that this alkaloid satisfies some common craving of all sorts and colors of men. But doctors disagree as to what precisely this craving may be and as to how and why it is satisfied by the drinking of tea or coffee.—*Indian Gardening and Planting.*

USES OF THE PEANUT.—The principal use of the peanut, is not, as some may suppose, to furnish sustenance for visitors to the country fairs and the circus. Peanut oil commands a high price in market, being second only to olive oil in value. It is used in making soap, for lighting and as a substitute or adulterant of olive oil. Peanut butter is coming into use, and peanut flour is also said to be successfully made. The cake left after expressing the oil is valued highly as a food for stock and peanut hay is considered equal to clover or timothy. *The Florida Agriculturist* is authority for the statement that the United States sent upwards of seventy thousand tons of peanuts to foreign markets in 1899.

DISAPPEARANCE OF THE FRINGED GENTIAN.—In 1898 I went through a swamp beside the railroad which was full of fringed gentians—there must have been several hundred plants at least. I picked one plant that had fifty blossoms, including buds and a few just going by. I only took three or four plants and am certain that very few if any others were picked, yet I have never been able to find a single plant there since. If anyone can give a reason for this I should like to know what it is.—*Walter M. Buswell.* [The behavior of the fringed gentian has always been more or less of a puzzle to flower lovers. In the editor's locality it seems to appear and disappear at will. Doubtless the fact that the plant is a biennial and reproduced from seed every two years has some bearing on the question.—ED.]

EDITORIAL.

Everyone who reads these lines has one or more friends who love flowers and are therefore interested in articles on the subject. We want their addresses in order to send them sample copies of this journal. A postal card is all it will cost our readers and it will be a great favor to us. But leaving this last consideration out of the question, is there anyone who will not invest a single cent in good literature for his friends. We think not. Remember, the more names the better.

The segregation and description of new species has progressed so rapidly in recent years that the student who got his information from the old "Manuals" is quite perplexed upon taking up recent works. Instead of the old familiar names he often finds from two to a dozen segregates, with strange titles, occupying their places. While it is admitted that botanical science moves with the rest of the world, it is the opinion of nearly all thinking botanists, that this species making has been rather overdone and that the time is not far distant when many so-called species will be relegated to their proper places as forms or varieties of the species we have long known. In commenting upon this idea before the Botanical Society of America, Dr. B. L. Robinson said recently: "It is easy to see that species as now recorded in literature are by no means alike and that they cannot be regarded as equivalents in any complete and logical system of classification. Curiously enough, however, the term 'species' seems to be growing more and more popular as it means less and less. How anxious most discoverers of new forms are that their plants may prove species, not mere varieties and finally what a fascination the mere binomial appears to exert upon certain minds! Is it any wonder, under these circumstances, that the specific category has been overcrowded and made to include such widely different elements that the word species has lost nearly all its taxonomic significance?" Dr. Robinson asserts that species must be re-classified along more definite lines. What these lines are no one presumes to say at present. It is probable that they will differ somewhat in different groups, but a species will ultimately come to possess about

the same values in any group. One thing is certain, however: the scientist who gives us the first fundamental laws for distinguishing these species from sub-species and forms, will make a lasting impression upon botany and be hailed as a second Darwin.

In the vicinity of New Orleans, where the thermometer rarely registers freezing temperatures, it is a source of unceasing interest to me to watch the bahavior of the plants. Were it not for an occasional breath from the north sweeping down the Mississippi valley and bringing with it a much lower temperature, many species that now are leafless would be green and perchance in bloom. The ordinary temperature is warm enough, but successive cold days put an end to renewed growth. At the first really cold night the lusty castor oil plants—many of them with trunks three inches through—wilted like poke-weed. The banana "trees" followed suit, and now, shorn of their leaves, stand with brown and ungainly stumps, waiting for spring. It gives one a curious feeling to see the banana turn deciduous; one would as soon expect it of the cocoanut. Certain palms weather the cold without protection, and many plants that drop their leaves in the North, here retain them. The elder is still holding to some of its leaves and no doubt will pull through without losing them all. On New Year's day, asters and goldenrods were still showing blossoms and the chickweed, of course, was in profuse bloom, but the woods and fields, for the most part, have a waiting expectant look. In the North, with such weather, I would have been sure of finding dandelions, but dandelions do not grow in this part of the world. Although not snowbound, Nature is nearly as dormant here as in New England.

BOOKS AND WRITERS.

G. Frederick Schwarz, author of "Forest Trees and Forest Scenery" is a scientist, but he has brought back from the woods and imprisoned in this little book some very readable matter about our forest trees and the character, distribution and adornment of American forests. He has a delightful style, entirely free from technical terms, and is particularly felicitous in his descriptions

of forest scenery and of the various species which go to make up the picture. To know the trees as he knows them one must have studied them long in their natural habitats and not in the library. In the chapter on "Forest Adornment," the decorative features of the woodlands are noted. Of some of the shrubs he says: "It is by crowding into masses that our shrubs of brighter blossom produce some of the most superb effects of spring. A multitude of rhododendrons or great laurels covers some mountain side, carrying its drifts of pale rose far back into the woods. A mass of redbuds and flowering dogwoods, the former again rose colored, the latter a creamy white, pours out from the forest's edge among ledges of rock and low hills. The wild plums and thorns with their delicate flowers are beautiful in the same manner and in addition have a pretty habit of straying out and away from the woods, much like the red juniper." The book is a 12 mo. of 180 pages and is one of the first productions of the recently organized Grafton Press of New York.

"Old Time Gardens, newly set forth by Alice Morse Earle—a book of the sweet o' the year," is the quaint title of a volume that comes to us from The Macmillan Company, New York. Between its covers is such store of facts and fancies about gardens and the flowers that grow in them, as must ever delight all those who love to dig in the soil or who find pleasure in a plot of cultivated plants. The book bears evidences of a deep knowledge of ancient gardening lore upon the part of the author, coupled with a no less intimate acquaintance with modern gardens and gardening. To the credit of the author be it said that although she is nearly always correct in her botanical facts, she does not write like a mere botanist. Even the titles of the chapters have an enticing sound as witness, "In Lilac-tide," "Front Dooryards," "Sun-dials," "A Moonlight Garden," "Flowers of Mystery," "The Charm of Color," "Plant Names," "Tussy-mussies," 'The Herb Garden," etc. The illustrations, of which there are many, are mostly from photographs of attractive vistas in our finest American gardens, and of themselves add much to the book's value. One must be wise indeed, who cannot get something new out of the nearly five hundred pages of this volume.

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AN EXPERT OPINION.

Turning away from the flying and creeping things of the earth and from the snap-shot methods necessary to portray their life, a feeling of coolness and repose comes to us from between the leaves of "Our Ferns in their Haunts." Last week, driving on the Parkman road, near the head of Lake George, we watered the horse at a barrel, fed from a spring on the hillside by the hollowed-out half of a tree-trunk. We climbed the slope above it and gathered quantities of ferns, differing, while the horse jogged on again, as to whether this or the florist's delicate pet was the real "maidenhair." There was no untechnical book in our collection, nor did we know of any in which we could "look it up." The next mail brought this book. It opened to a pen-and-ink sketch of what looked like our drinking place. Further on in the book we found—was it the very clump from which our ferns had been taken? It might have been, for the surroundings seemed identical. Our questions were answered, as were several others, and we were given a digestible morsel of science with a salad of maidenhair folk-lore, all served up in the best of descriptive English. The make up of the book is admirable. The colored plates, wash drawings and pen-and-ink sketches are artistic and at the same time accurate in detail, and the bits of quoted verse and folk-lore are as attractive as the illustrations.—*Literary Collector.*

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FLOWERS OF THE ENGLISH WAYSIDES.

BY C. F. SAUNDERS.

To an American visiting an English countryside for the first time, the common wild flowers by the way are an unfailing source of pleasure. Like the people, who speak the same tongue with himself but with enough difference to clothe their language with a marked individuality of its own, the English flora continually reminds him of his home plants but at the same time interests him by the presence of many striking differences. The families and genera are usually such as he has been familiar with, but very often the species are different. Thus the common daisy of England is not our ubiquitous ox-eye—though this grows in Britain, too—but that pretty little "crimson-tippet" flower immortalized by the poet Burns, which we know only as a greenhouse or garden plant. So, too, the wild geranium of English meadows is not our well-known spotted cranesbill, but a showy blue flower much resembling its American cousin in other respects.

The thistles are as common over there as here, but the American must needs consult his book to determine the species. One of the most striking is the stemless thistle (*Carduus acaulis*), whose single head of royal purple bloom is borne sitting flat on the ground in the midst of a rosette of radical leaves. This species is common in Scotland and it has been claimed that it was a plant of it that figured in that historic episode which led to the adoption of the thistle as the Scottish national emblem. The pea family is represented by many interesting species unfamiliar to American eyes. One with pretty rose-colored flowers is quaintly called rest harrow, because the long tangled roots impede the working of the ground. The Dyer's Broom (*Genista tinctoria*) forms bright yellow patches in many pastures. To the same fam-

ily belongs the common furze or gorse, a plant as prickly as a thistle, the very reverse of what one would expect a sweet pea's relative to be.

Many cherished flowers of American gardens are familiar roadside wildings in England. Among such may be mentioned the ragged robin, the yellow pansy and the Johnny-jump-up. The last is particularly dear to the popular heart as is evidenced by the multitude of common names by which it goes, forty or more being ennumerated in Britten and Holland's "Dictionary of English Plant Names." One of these, "Meet-her-in-the-entry-kiss-her-in-the-buttery," is thought to be the longest plant name in the language. Another popular name of the same exquisite flower, and one that is said to be still in use in Shakespeare's native Warwickshire, is "Love-in-idleness," which occurs in a well known passage in "A Midsummer Night's Dream:"

> "Marked I where the bolt of Cupid fell;
> It fell upon a little western flower—
> Before milk white, now purple with love's wound—
> And maidens call it love-in-idleness."

The fox glove's languid bells, too, are common sights on roadside banks and in the woodlands of many parts of England. On the grouse moors many charming wild flowers bloom—most characteristic of which are the heath (*Erica tetralis*) and the ling (*Calluna vulgaris*). The latter is the famous heather of Scotland. Both plants grow intermingled on English moors and as they cover large areas, make, when in bloom, a sight not soon to be forgotten. The blossoms of the heath are especially beautiful —small globes of a warm rose color, borne in clusters at the summit of slender stems. The moors are also rich in the low bushes of the bilberry, a sort of huckleberry with reddish flowers that expand in the spring. The fruit ripens in late July and the country folk are usually permitted to pick the berries until the 12th of August when all trespassers are ordered off the moors, as that date marks the opening of the shooting season. In similar situations one finds the harebell (the blue bell of Scotland, one with

our American species), yellow cinquefoils and white bedstraws, speedwells with blossoms nearly half an inch across, a blue-flowered polygala and the pigmy eyebright.

One of the oddest of the wayside plants is a small grass, sometimes only two or three inches high, which botanists call *Briza media.* It bears its flowers in comparatively large, panicled spikes, which are sensitive to the slightest breeze and consequently are almost always trembling as they hang. This peculiarity has, of course, attracted the attention of the country people, who in England, are rather more observant of plants than those in a similar walk of life in America, and the little plant goes by half a hundred different names in the various counties of the kingdom. Thus it is known as doddergrass, doddering dickies, earthquakes, shivering Jenny, wiggle-waggles and quakers—the last perhaps the most common.

A word may be said in relation to the trees. The characteristic British oak, in fact the only species that is really native, is the one known to botanists as *Quercus Robur.* It is a noble tree, akin to our white oak, and one does not wonder that among the primitive Celts and Tentons it was set apart as sacred to the greatest of their gods. Scarcely less beautiful is the British ash (*Fraxinus excelsior*), which seems of a rather statelier habit than the American species. Like the oak, the ash is associated with many an old world superstition. Readers of Norse mythology will recollect the sacred ash tree Yggdrasil, which bound the earth to heaven and to the underworld, and that it was from an ash and an elm that the first man and woman are said to have been created. The elm is one of the characteristic trees of Warwickshire, where the roads are often lined with magnificent specimens of it—not the American elm, however, but *Ulmus campestris.* A favorite tree in cultivated grounds and in the parks of the gentry is the European linden, or lime as the English often call it. It blooms in late July and perfumes the air to the intoxication, doubtless, of every bee in the neighborhood. Another common tree of the wayside is what the English style the Sycamore—really a maple, being in fact the *Acer pseudo-platanus,* which has been intro-

duced to some extent into American cultivated grounds. It is a doubtful native of Britain, but has been so long established there that it has become a characeristic feature in the countryside.

Of cone-bearing trees there is none that is native of England except the Yew. This is frequently met with in churchyards and about gentlemen's country seats—a sombre, funereal-looking tree, 30 or 40 feet in height, famous in old times as the stock from which the British yeoman made his invincible bows. The Scotch pine often appears in abundance in sequested tracts, but it has been introduced from the Land o' Cakes. *Philadelphia, Pa.*

THE FLOWERS OF PIKE'S PEAK.

By Mrs. S. B. Walker.

During the placing of my exhibit of 300 square feet of the pressed flowers, ferns, etc., of Colorado, in Colorado Springs, last year, many comments were heard as to where this and that plant was to be found that were sometimes very wide of the mark. One day I went to the summit of Pike's Peak and thinking, grass from the summit and a few of the high, alpine flowers and ferns would be an added interesting feature, I placed them on ice inside the glass case. Later, standing with others near by, our attention was attracted by hearing a voice loudly declaiming, "Flowers from Pike's Peak at 13,000 feet altitude, grass from the summit; Gracious, there is not a spear of grass on the summit and not a flower within three thousand feet of the summit. I've been there myself!" and the party passed on.

Nevertheless, grass *does* grow at the extreme summit, and ferns are found near the top at 13,300 feet altitude, and they are not so rare, either. The tiny blue forget-me-not (*Myosotis alpestre*) is found at 13,500 feet altitude, growing in the shade of the overhanging rocks clustered about with grass and the deep blue, fragrant bells of *Mertensia alpina*. Against the lichen covered granite boulders in the background, tall and stately, throwing its crimson gleam far out, are fine specimens of *Primula Parryi*. The yellow flowers are supplied by *Senecio aureus* var *borealis*, while a trifle higher are found the cheery, more delicate blossoms of the

golden saxifrages (*Saxifraga aizoides* and *S. chrysantha.*) The pink-purple blossoms of *Silene acaulis* are plentiful and growing fresh and crisp from its bank of snow is *Gentiana frigida.* All these varieties together with *Castilleia pallida* var *occidentalis Saxifraga nivalis, Draba, Polygonum* and many beside can be found on one trip, providing the trip is taken late in August.

THE BEGINNING OF A SOUTHERN SPRING.

By Willard N. Clute.

In southern Louisiana, the transition from Autumn to Spring is marked only by the briefest pause where the two seasons meet, such as one must expect while the scenes are shifting. Up to the very end of the year, a few belated asters and goldenrods are to be seen, while ten days later the first blossoms of the elm and maple are fringing their leafless branches. You may call this Winter if you like—there is an occasional frosty night and not infrequently trees bear icicles instead of flowers—but the violets and chickweed bloom through it all, and down in the warm, moist earth a thousand early plants are pushing up; in fact I am not sure that spring has not been lurking there all the while. It seems to me that last Autumn I marked the same aspiring points of green beneath the aftermath of Summer that are now lengthening in the swampy grounds. The city lawns are as green as a northern meadow in May and the grass—*Poa annua,* probably—is everywhere in bloom.

Most noticeable of the early flowering trees is easily *Acer Drummondii,* the southern counterpart of the northern red maple. To call this a red maple, however, but faintly expresses it. The red maple is quite pale in comparison. The flowers of the two species are nearly alike in color, but the fruit of the southern tree is of the deepest and most vivid scarlet, and glows among the grays and pale greens of surrounding trees with truly dazzling splendor.

Residents of this part of the world do not know the trailing arbutus, for that plant, like a true heath wort, keeps to a colder and more rugged land; but in its stead they have the devil-wood

or sweet olive (*Osmanthus Americanus*) and ought to be satisfied. Although the olive often attains the proportions of a small tree, it has many characteristics that recall the arbutus. Its leaves are evergreen, and the flowers, though rather smaller are very similar in appearance. They are borne in axillary clusters and are probably more fragrant than those of the arbutus. The flower-sellers usually place a spray of these flowers in the center of their bunches of violets for the sake of added fragrance. The tiny stands of these flower-sellers, it may be added, are among the characteristic sights of New Orleans. Here and there, in convenient corners along the sidewalks—or banquettes as they are called here—they are located. At this season they are usually piled high with bunches of violets, and the buyer may have his choice of the lot for five cents.

As elsewhere, the weeds vie with other early flowers for first place. If the chickweed ceases blooming at all it must be during the dryest and hottest part of Summer, and other weeds appear scarcely less persistent. Late in January, I plucked a plant of yellow oxalis from between two paving stones in a city street and found it full of buds, blossoms and fresh green seed pods, the latter nearly an inch long. When the blossoms that produced these pods opened, is a matter for conjecture. I have a suspicion that the early flowers are cleistogamous.

No doubt the coming months will bring something fine in the way of wild flowers; but at present the woods have a deserted air to one accustomed to the sight of trilliums, bloodroot, bellwort, adder-tongue, spring beauties, hepaticas and the host of other flowers that make the northern spring beautiful. Here are acres upon acres of swamp land and not a single skunk's cabbage to push its spotted cowl above the flood and keep the peeping frogs company. Everywhere the earth teems with promises of spring —quickening seeds, unfolding buds, lengthening shoots, radical leaves daily spreading into larger rosettes, thistles already large enough to fill a wash-tub—but as yet few or no showy flowers, although various species of butterflies are winging their way over the fields apparently in search of them. The bulbous plants and

plants with thickened underground rootstocks, from which the earliest flowers of the North spring, are rare or absent here. What shall it profit a plant to store up food against a time of bloom in a climate that will supply food as it goes along? "There is no need for haste; take life easy," seems to be the motto of both plants and people. But owing to this lack of haste on the part of the flowers one of the principal charms of early Spring is lacking.

THE BLOOMING OF THE HONEYSUCKLES.

Dr. Byron D. Halsted has been watching the blooming of the twining honeysuckle (*Lonicera Japonica*) and finds much of interest in the way the flowers open and provide for their insect visitors. He notes that the majority of the buds expand into flowers between six and seven o'clock in the evening and as soon as the corolla opens, exposing the stamens and styles, the strong fragrance is sent forth while the anthers show large quantities of pollen. In his article on the subject in the *Plant World,* he says:

"As the sun declines and the air gets more and more laden with the honeysuckle fragrance, due to the increasing number of freshly opened flowers, the various night-flying insects are in evidence. Among the most conspicuous of these is the sphinx-moth, which pauses before each of the white blossoms long enough to take a sip and then darts on to the next. So busy are they in their round of service, that, standing motionless, the interested watcher can have them close to his eyes, see the whole and exceedingly simple process all done while upon the wing. The down-turning of the single lobe of the corolla and the upturning of the other four united making an arched opening into which the long protruding stamens and style provide guides, combine in forming a cavity into which the proboscis of the moth is thrust, and the nectar being close at hand is easily removed without the flower forming any resting place for the insect attendant. The wonder is that the moths can sustain themselves so steadily in front of each blossom; but from the almost inaudible hum it is evident that the large and delicate wings are moved with remarkable rapidity.

The moth in question has a rival in the person of master humming bird, and so much alike are these to the unobserving observer that only a dancing, swaying, hazy, vanishing blur is seen in either case against the indistinct background of the honeysuckle hedge in the deepening twilight. The humming bird is less easy to study, and to get close to his fast fluttering wings is a rarity indeed. As soon as the busy bird is once recognized by his long, needle-shaped bill, bright, iridescent plumage, exceedingly quick, darting motions and characteristic humming of the wings he is not confounded with the sluggard of a moth or any other creature. The bird, like the insect, with which he might weigh in the same notch, pauses in the air before the evening blossom and quickly sips the nectar without indulging in the climbing method of alighting as is in vogue with the heavy, short-winged bumble bee. The bird makes a cleaner job of it than the moth in every way. His eye may be keener sighted and his body more submissive to his will. The bill may be a better instrument than the proboscis for extracting the honey. Who can tell whether the blossom and the bird are made for each other's best interests, and the moth is an interloper.

Those who are familiar with the honeysuckle blooms are aware that upon a vine some are white and others are creamy in color, then a light yellow-orange, and lastly a darker shade of the two neighboring colors as the flowers hang collapsed upon the short stems. The rapidity with which these blossoms pass these stages has been a matter of observation and surprise. Each of these branches usually has upon an average six successive nodes that are to bear blossoms, the series being preceded by a few neutral nodes and followed by an indefinite number that are entirely vegetative. The blooming of a series represented by any stem is usually compassed by a week or at most ten days—the rapidity seeming to depend upon the individual peculiarities of the plant or some circumstances of nourishment and the weather. During the period of watching there was a rainy day and night, and upon the intervening evening there was but little show of bloom and a noticeable absence of the characteristic fragrance, and of course of the insect

and bird attendants. A halt was called in the regular procession of bloom that may or may not have affected the whole period of blossoming. But this is a fact that can only be obtained by extending the observations over many seasons.

To the reader unfamiliar with the *Lonicera,* it may be said that the long, slender, twining stems bear their leaves in pairs upon opposite sides of the stem. Between the bases of the leaf stalk and the stem above, a bud arises which quickly forms a stem an inch or so long, bearing a pair of small leaves, and between these two flower buds form. It is thus seen that at each joint or node upon the stem there are two brief side shoots each bearing two flowers —that is, four blossoms are produced with but very few exceptions at a node, or none at all. When once a series of flowers has begun there are no breaks in it until the end is reached. The four buds very regularly open upon the same afternoon or evening, and display their four white corolla lobes through the live-long night. The next morning they begin to take on a suggestion of cream color, which rapidly develops as the day declines, and becomes strongly in contrast with the four swelling white buds of the next younger node that are destined to follow along the same road twenty-four hours later. By the second evening the flowers have become orange-yellow and lost their fragrance—at least it is lost in the richness of the younger blossoms which become the only ones before which the moths and humming birds pause for their evening draughts of nectar. Of hundreds of such transient visitations the writer has never seen an old flower considered for an instant. They appear as oblivious to them as if they were not there. It may be that the eyes of the night flyers are color blind to the hybrid yellow-orange, while they are sharp indeed upon the white. With thoughts like these in mind I have watched the hedge-row as the darkness deepened until the old flowers passed from sight and only the fresh white ones stood out distinctly against the background of the obscured vegetation.

Sometimes one of the quartette of blooms gets belated and comes into flower along with the four upon the next younger node; but then it is out of place and the chances for visits are di-

minished, for the four make an attractive setting, and all can be sipped before advancing to the next group. The torsion common to the lonicera stems provides that all the flowers present a uniformly open front; in other words, they hang the banner upon the outer wall, even though it may be necessary to turn a sharp corner in the event.

It has been said that a new set of four flowers is not uniformly provided for each new day. That may be the rule, but there are dark days and rainy days, and so the uniformity is more or less broken. This, however, seems to be the rule—that no half-ways are indulged in, and if a bud is not quite ready to open upon one afternoon, it holds over until near the close of the next, thus giving forth its perfume upon the evening air, and at a time when night-loving insects may catch sight of its showy whiteness and sip its sweets, while incidentally bringing to it the pollen from some other blossom. Back of all the plan that has been written upon, there lies between the lines the deeper one of wide pollination, which perhaps both honeysuckle and honeysucker knew nothing about, and yet is essential for the well-being of each, and succeeds so well in the great struggle entailed upon all living things."

THE REDWOOD AND FOG.

As is well known, the redwoods occur in the fog-belt of the northern half of California and are confined in a markedly restricted manner to those portions of the coast mountain ranges, such as ravines, which, on account of favoring topographical conditions, the fog may reach. The restriction of the distribution to so narrow a zone, is, perhaps, not due so much to the negative factor, the conservation of moisture already present, as to the positive one, the actual precipitation of water from the fog. While this, without question, is an important factor in the total precipitation in any region subject to fog, it becomes very much more marked, I am convinced in that region where the redwood forests are found. The reason for this lies in the character of the foliage of the redwood. Because the leaves of the redwood are small and

closely set together on the twigs, and because both twigs and leaves are relatively delicate, the boughs which they help to form are fern-like in general appearance and constitute a very effective filter, by which water may be "combed" out from the fog. In the effectiveness of this filtering process, which is said to be a good method for removing water from the fog, lies, I believe, an important reason why the redwood loves the zone subject to fogs.

So far as I know, there is no method in use for determining the amount of fog precipitation. The amount of water in a fog which extends vertically 1,000 feet may be equal to 0.1 inch rainfall. But, of course, only a small portion of this is precipitated. This amount, however, can be greatly increased if the fog is passed through such a filter as is formed by a redwood forest, and under such conditions the amount of water taken out of the fog by the trees is considerable. I have been told by a gentleman who owned a large ranch in the redwood belt, and whose observation was quite trustworthy, that whenever there was a fog, especially if accompanied by a wind, the soil beneath the trees appeared as if drenched by a heavy rain; and that, further, in cases of fires in his forest, if a fog came up, accompanied by wind, the fires could be brought under control.

The relation of the redwood to fog precipitation is shown in another way, which although sufficiently *bizarre* in itself, is vouched for, and may lend a hint to a possible method of estimating the amount of water precipitated in this manner. On the "hog back" of the Santa Moreno mountains lives a woodchopper in a place once heavily covered by a redwood forest, but where there is left only an occasional large tree. Like other mountaineers, he must use water for culinary purposes, at least, and in lieu of a convenient spring or well, he has devised a unique "tree-well." The chopper has fashioned the ground beneath a large redwood into the form of a trough at the lower end of which he has placed a barrel, and I have it on good authority that in this primitive manner he obtains sufficient water for his needs.—*From an article by W. A. Cannon in Torreya.*

SELF-PRESERVATION IN PLANTS.

The instinct of self-preservation in the vegetable world is perhaps not less, but merely less obvious than in the animal kingdom. Our scientific friends are apt to freeze our sanguine hopes by informing us with emotionless mien that the individual is of no moment, the preservation of the species, only being of consequence. Self-preservation is then but a step in the direction of preservation of species, and, broadly construed, must include the instinct of reproduction.

So anxious do some plants seem to avoid being the last of the line that they provide themselves with several means of procuring descendants. The common garden onion affords a convenient example. If a row of onions in the flowering stage is examined, it is probable that a considerable number will be found bearing both flowers and bulblets or "top onions," while we are all familiar with the onion having two or more cores. Here, then, we have one means of reproduction and two of multiplication; seed from the flowers, young onions or bulblets, and division in the bulb, forming what is known as a "multiplier."

The potato plant may propagate itself from the tuber or from seed; the strawberry by runners or by seeding; the verbena by seeding and by rooting at the joints or nodes. In some plants if a leaf falls to the ground, it will, under favorable conditions, strike and develop a new plant. This is true of some begonias, and remarkably common with *Bryophyllum;* and species of *Mesembryanthemum* are often propagated by cutting the plant in pieces and scattering them on the ground.—*L. A. Greata in California Floriculturist.*

NOTE AND COMMENT.

Wanted.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

Rooting of Oxalis Leaves—In the *Plant World* for November, 1901, John L. Sheldon records the rooting of the leaves of

several species of *Oxalis*. The leaves were broken from the plants and the petioles buried in moist sand. In a few weeks several put forth roots, especially the younger leaves. Upon some of these roots, tuber-like bodies were formed, but it was not ascertained whether the leaves could be made to produce true bulbs and tubers as the plants ordinarily do.

Origin of the No. 11 Mango.—In Jamaica, the mango is one of the most important of fruits and in its season furnishes a great part of the food supply of the negroes. The trees are now thoroughly naturalized and the fruit is more or less varied in quality. The variety generally regarded as the best is known as the "No. 11." Regarding the origin of the name, a note in the *Bulletin* of the Botanical Department of Jamaica has it that in 1782 a British ship captured a French vessel bound for Hayti which had on board many economic plants and seeds. The vessel with her cargo was sent as a prize to Jamaica and was thus instrumental in introducing the mango into that part of the world. The plants in the cargo were numbered and No. 11 was the mango that has since become famous.

Non-indiginous Flora of Ohio.—Owing to various causes the flora of most areas is constantly, though slowly, changing. Sometimes this change is so rapid as to be noticed by the casual observer, as when a new weed suddenly spreads into new territory. Few realize how many different species in any given locality have appeared there since the country was settled. A pamphlet on the "Non-indiginous Flora of Ohio," by Prof. W. A. and Mrs. Kellerman, notes that in Ohio there are 430 species of introduced plants, or nearly twenty-two per cent. of the whole flora. Of these 36 are shrubs or trees, 47 are grasses, and 49 are in the class which the farmer regards as weeds. The remainder are species mainly of interest to the botanist. A list of 40 native weeds is presented for comparison, and it is interesting to note that the worst weeds are all in the list of foreigners.

EDITORIAL.

Some time early in the last century, Stephen Elliot began the publication of "A Sketch of the Botany of South Carolina and Georgia." After the first part was issued the author recalled it, and after making various changes, reissued it. The original issue seems to have been completely destroyed. Ordinarily this is not much to be regretted since we have copies of the revised issue, but a writer in the December *Torrey Bulletin* thinks otherwise. He says: "No copy is now known to exist, and if any should be discovered it would be of the utmost importance that fac-similes of it should be prepared and distributed, for there is no question, whatever, that it was properly published in every sense of the word, and if its contents were known it would necessitate the alteration of several names of southern species." Curious how the scientist occasionally looks at things, isn't it? To most people it would seem that if that old pamphlet should ever appear, with its threat to change the names of certain southern species, the best and quickest way to dispose of its case would be to throw it into the fire.

Notwithstanding the great interest that at present attaches to botanical studies, we have as yet no botanical society that has assumed a really national character. This is all the more remarkable because certain families of plants, such as the ferns and mosses, have such societies for their study. We have, it is true, a "Botanical Society of America," but this is an exclusive organization into which the ordinary botanizer may not enter. A national society which shall be democratic enough to admit any student of plants, while extending to him the fullest measure of assistance in his work is still desired. Among the objects of such a society would naturally be the protection of our native wild flowers, the preservation of plant names, the cultivation and naturalization of desirable species, the exchange of living plants, seeds and herbarium specimens, the assistance of its members in the study of plants and the recording of new facts concerning them. While there is no society that exactly covers this ground, the Gray Botanical Chapter of the Agassiz Association comes very near it, and our

readers may find it advantageous to join it. This Chapter was organized in 1888 and was specially designed for helping beginners. It is principally engaged in the field study of our native flowering plants, but welcomes to membership all who are interested in any branch of botany. The annual dues are twenty-five cents. The Chapter issues as its official organ a monthly "Correspondence Bulletin," written by the members and containing records of personal observation. These Bulletins are sent through the Chapter from member to member and promote an excellent feeling of comradeship while stimulating each member to further study. Copies of the Chapter's constitution and further information may be obtained from the General Secretary, Mr. William H. McDonald, 122 Pearl street, Elizabeth, N. J., who will take pleasure in putting any lover of botany in the way of becoming a member of the Chapter, if desired.

People who are not botanists usually have a hazy idea of range in plants and fail to catch the enthusiasm of the student who rejoices at finding some insignificant weed hundreds of miles beyond its reported range. It is a common belief that plant species in general are likely to occur in almost any part of the world having the same temperature, and it usually requires considerable explanation to enable the average individual to comprehend that different kinds of plants, like nations, are restricted to certain definite areas on the globe. In fact, the average individual seldom thinks much about plants, except in the case of those with striking peculiarities, when he is likely to believe that they grow nowhere except in the spot where he has found them, and that they will not survive, even under cultivation in other localities.

BOOKS AND WRITERS.

—The late Thomas Meehan has been succeeded by his son, S. Mendelson Meehan, as editor of *Meehan's Monthly*.

—*The Bryologist*, which changed to a bi-monthly in January, has advanced its subscription price to one dollar a year.

—At the beginning of the year *The Forester* and *National Irrigation* joined forces and will henceforth be published as one journal under the title of *Forestry and Irrigation.*

—With its fourth number, *California Floriculturist,* of Los Angeles, has been considerably increased in size, a pleasing indication that this bright Western journal is prospering.

—We regret to note that a fire on the night of January 14th, destroyed the building and collections of the Manchester Institute of Arts and Sciences. The Institute's journal, *Nature Study,* suffered some loss, but appears on time as usual.

—It is but a comparatively short time ago that one who desired to make the acquaintance of our native flowers without an instructor to introduce him, found it an exceedingly difficult matter. A stubborn and persistent student might at last conquer a botanical text book, but to the great majority the scientific phraseology was too forbidding and the book might as well have been written in Chinese. We owe a vast debt of gratitude to the makers of the Manuals who amassed and recorded the botanical facts; but it may be questioned whether our debt to those later writers, who, by popular books, have opened this storehouse of knowledge to the general public is not still greater. Books of a popular nature are now so plentiful and approach the subject from so many different sides that the beginner can scarcely go astray. Even if he misses the way in one book, another will set him right. One of the best of these botanical guide-posts is "A Guide to the Wildflowers," by Alice Lounsberry, published by the F. A. Stokes Company of New York. This treats of our wild flowers according to the kind of soil they inhabit, and describes nearly five hundred plants. Its value is further enhanced by sixty-four full page colored plates and one hundred more in black and white by Mrs. Ellis Rowan, which show about two hundred of the typical plants described. The book is an octavo and costs $2.75.

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FLORAL ECCENTRICITIES.

BY ALBERTA A. FIELD.

How natural it is for us to interest ourselves in abnormal conditions, and also to be more observant of "their" than "our" oddities. But not alone on us supreme (?) creations of the universe do these eccentricities expend themselves, for there are many "queer people" among all sorts and conditions, from the highest to the lowest, and while less has been written upon the peculiarities of plants, much has been observed that must engage our interest. Sometimes these peculiarities are of the species and sometimes of the individual, but generally speaking they are abnormal. A little observation of plant life will teach us that they possess many human characteristics or attributes and upon occasion exhibit energy, endurance, ambition, sensitiveness (this in a marked degree), incongruousness, adaptability, modesty (but less of this characteristic than the sentimentalist would have us believe), secretiveness, determination, all these and more.

In speaking of the different flower characteristics I forgot to mention one of the most strongly marked, and that is the desire for the perpetuation of its kind, and there is no end to which a plant will not resort to secure this result. Since science has so enlightened us upon the subject of vegetable fecundation, our appreciation of the difficulties that many plants are obliged to overcome, is greatly intensified. In many cases the staminate and pistillate flowers grow on separate plants, and alien assistance has to be resorted to for the transference of the quickening pollen dust. Some of the more prudent ones, to guard against the accidents of destruction by the elements and other emergencies, produce cleistogamous flowers below or above the ground, which never open, but remain closed and amply self-fertilizing to pre-

vent possible extinction, though most plants advocate cross-fertilization, fearing that the more simple method proves degenerating. Sometimes this careful forethought is a family distinction, as in the case of some of the milk-worts. For instance, the prudent *Polygala polygama* or racemed milk-wort's upper branches are covered with many open petaled flowers that advertise their wares conspicuously in order to secure the benefits of cross-fertilization. But below the surface on the tiny root-like branches are numerous pale little flowers whose work is in reserve in case the more beautiful blossoms fail in their natural functions. They insure the perpetuation of their kind though they never open their petals to admit the dangers of the elements, or risk a shortage of cargo-carrying insects. But a sad life must these little workers enjoy, while they minister to the economics of plantdom, for Cinderella-like they delve in the bowels of the earth with no prospect of a fairy god-mother to compensate them, and only a consciousness of a duty done, in reward for their sacrifices. But in the meanwhile, the more fortunate blossoms of the upper air, flaunt their gay petals through the summer gladness and flirt in the sunshine with passing bee and breeze.

Another little plant that bears the euphonious appellation of "Venus' Looking-glass" but whom scientists know as *Specularia perfoliata,* also bears these cleistogamous flowers. They do not hide themselves beneath the sod, but dwell quietly upon the base of the flower stalk, each clasping sheath of green carefully hiding three tiny little buds which are abundantly prolific in themselves, and they too avoid the dangers that society upon the upper stalks of life are exposed to, for they open no hospitable doors to bees or wind. But there are only a few of these flowers of high life that show their delicate beauty to an admiring public, and they are situated at the top of the flower stalk where they flaunt their bluish petals in the gladdening sun and enjoy life after the fashion of their kind.

There is a quaint interpretation of the naming of this flower which reads: "It is related that Venus one day let fall to the earth one of her mirrors; a shepherd found the jewel, and as soon

as he had cast his eyes on the glass that possessed the power of embellishing whoever looked at it, he forgot his mistress, and only thought of admiring himself; Love, fearing the consequence of so foolish an error, broke the glass, and changed the remains into this pretty plant that has retained the name of Venus's looking-glass." But why Venus, that vain immortal, should raise so insignificant a memorial to her beloved mirror, passeth the understanding of the feminine.

It is said that there are about 55 genera of plants that contain one or more species, which so secure themselves in the matter of perpetuation, and among the more familiar are the violets, the peas (and the latter produce an abundance of cliestogamous bloom) wood sorrel, jewel-weed, etc. Yet all of these plants show evidence of their fear of degenerancy of self-fertilization for they all produce developed flowers that solicit the aid of insect life in the transmission of pollen. A careful study of the complex economics of the flower kingdom, positively astounds one by its system and forethought.

ORIGIN OF DOUBLE FLOWERS.

Reverting to the subject of double flowers, we may begin by eliminating those which in a botanical sense are not double. This sweeps away all the so-called double Chrysanthemums, Asters, Daisies, Sunflowers—all the Composites, in fact, which owe their epithet "double" to conditions which are not the same as those to which the botanist applies the world "double." Another class of so-called double flowers occurs when a petal, instead of remaining single, divides or branches either radially (some Mallows) or collaterally (Primrose). What, then, are double flowers? In a strict botanical sense, double flowers are those in which an additional number of petals is produced, either by actual increase of number, or by the substitution of petals for stamens or for carpels, or both (Rose Camellia, etc.).

It is quite possible that the causes which bring about these various kinds of double flowers are also diverse, and this being so, it may be of great practical importance to determine what they

are. In some cases we say, and rightly, they are hereditary; but this explains nothing, it only implies that there was a time when the structure was different from what it has since become. What brought about the change, and why has it become fixed and hereditary?

Again, we say glibly—but, no doubt, with some truth—that these double flowers are the result of some differences in the conditions under which plants grow—to a difference in the "environment," as it is the fashion now to say. These changes bring about a corresponding alteration in the nutrition of the plant, and so on. All this is true enough, but it is not sufficient for practical purposes. We still want to know how and why. The difficulty of finding out is increased by the fact that we constantly find one plant out of many producing double flowers, or it may even be one flower out of several on the same branch, that is doubled, while all the others are normal, and yet the "environment" is, for aught we can see, unchanged.

Of late years the production of double flowers has been attributed to the action of mites or other insects, to fungi, and quite recently to the influence of nematode worms in the roots. It cannot be denied that such causes may be operative. All that we can say is, that although we are pretty familiar with double flowers in a wild and in a cultivated state, as also with the effects of injury from insects and fungi of various kinds, yet we have never seen any such morphological changes as are exhibited in "double" flowers as a result of parasitic injury. What we do find in such case are pathological deformities in which regularity of conformation is abolished, and more or less shapeless masses ensue, or, as in the case of galls, we find a regular adaptation to the requirements of the insect.—*Gardener's Chronicle.*

SURVIVAL OF DESERT AND ALPINE PLANTS.

Many seemingly inhospitable regions possess a comparatively rich flora and the wonder is, how the various species manage to survive in such places. A hint in the matter is given by Elias Nelson in the *Plant World,* who, writing of the Rocky Mountain

plants, says: On the higher slopes great snow banks linger into late June, July, or even into August. Sharp freezes and skifts of snow usher in September. During the few, sometimes very few, favorable weeks, magnificent flowers, gentians and erythroniums, asters and erigerons, pentstemons and delphiniums, spring up and develop into blossom and fruit with a celerity scarcely surpassed by Jack's famous bean stalk. These are the descendants of ancestors that for many generations have succeeded in gradually accelerating the life activities, not into the "pace that kills," but into harmony with a changing environment. On our cold, arid plateaus we see the same conditions and the same processes and results. The examples may be less striking, but even here the forms that survive have had many a sharp lesson.

But no more striking example can be given than is exhibited in some of the interior deserts, the Red Desert of Wyoming, for example, where not the shortness of the season by the scarcity of water is the prime cause of the noticeable haste. In such localities the moisture that falls is principally the snows of late spring. These on melting furnish the water which must carry many of these desert forms to full fruition. The cloudless skies of June bring to maturity many small annuals that spring into life in cool but moist May. More numerous perennials scatter far and wide their abundant fruitage before July's sun bakes completely dry valley, hill and plain. These latter have adopted the storage plan as the best means of securing the requisite speed when the favorable season comes. Rhizomes, bulbs, tubers and roots, often enormous, are packed full of food materials which are converted into immediately available funds to meet the heavy drafts that the rush season demands.

There is perhaps no class of plants that have learned the art of hurrying so well as the generally despised weeds. A cockle-bur and a pigweed rarely fail to mature some seed. Cut them off near the ground repeatedly during the summer, and each time they will put out new branches from the stump. These may in turn be destroyed, till as Autumn approaches you forget about them, but they do not forget their business. When the season

closes a few prostrate branches will be found with mature fruit.

That plants, like most people, will not hurry except from necessity, was abundantly in evidence during the field work of the past season. The identical species (various Eriogonums, Senecios, Solidagos and many others), that were in full bloom on the higher plains of more northern Wyoming in late July or August, had reached only the same stage of development by the first of September, in middle Colorado and southward. The contrast was all the more striking, since the Colorado season opens two or three weeks earlier as well as closes as much later.

THE MYSTERIOUS MANDRAKE.

The name Mandrake in America is usually applied to the May-apple (*Podophyllum peltatum*), but the Mandrake of history is a Mandragora and is a native of the Mediterranean region. It belongs to the order Solanaceae and is, therefore, allied to the tomato and nightshade. The mandrake has long been the subject of much superstition.

The root is forked and fleshy, presenting a rude but startling likeness to the human figure. From it the leaves spring with no apparent stem and among them the stalked whitish flower appears. The fruit is a one-celled berry about the size of a sparrow's egg. The whole plant has an unpleasant and narcotic smell, although the fresh berries, when bruised exhale a pleasant odor like wine and apples.

All parts of the plant have poisonous properties like the belladonna, only more narcotic in their nature and for this region the root was often administered before a surgical operation. Plato speaks of it as a soporific, and the people of the east, to this day refer to an indolent person as "One who has eaten mandrake." Shakespeare alludes to this when Cleopatra says "Give me to drink Mandragora, that I may sleep out this great gap of time. My Anthony is away."

A superstition connected with the use of the mandrake as a medicine, is that a small dose makes a person vain of his beauty and conceited but that a large dose makes him an idiot. This

popular belief was also recognized by Shakespeare when Banquo, after the uncanny vistation of the "weird sisters," asks fearfully and wonderingly of Macbeth, "Were such things here as we do speak about? Or have we eaten on the insane root that takes the reason prisoner?" In "Othello," he says, "Not poppy, nor mandragora nor all the drowsy syrups of the world shall ever medicine thee to that sweet sleep which thou owedst yesterday."—*California Floriculturist.*

ORCHIDS AND THEIR INSECT SPONSORS.

Prior to Darwin's time the flower was a voice in the wilderness, heard only in faintest whispers, and by the few. But since his day they have bloomed with fresher color and more convincing perfume. Science brought us their message. Demoralizing as it certainly was to humanity's past ideals, philosophic, theologic, and poetic, it bore the spirit of absolute conviction, and must be heard. What a contrast this winged botany of to-day to that of a hundred years ago! The great Linnæus would doubtless have claimed to know the orchid, which perhaps he named. Indeed, did he not know it to the core of its physical, if not of its physiological being? But could he have solved the riddle of the orchid's persistent refusal to set a pod in the conservatory? Could he have divined why the orchid blossom continues in bloom for weeks and weeks in this artificial glazed tropic—perhaps weeks longer than its more fortunate fellows left behind in their native haunts—and then only to wither and perish without requital? Know the orchid?—without the faintest idea of the veritable divorce which its kidnapping had involved.

Thanks to the new dispensation, we may indeed claim a deeper sympathy with the flower than is implied in a mere recognition of its pretty face. We know that this orchid is but the half of itself as it were; that its color, its form, however eccentric and incomprehensible, its twisted inverted position on its individual stalk-like ovary, its slender nectary, its carefully concealed pollen—all are anticipations of an insect complement, a long-tongued night-moth perhaps, with whose life its own is mysteriously linked

through the sweet bond of perfume and nectar, and in the sole hope of posterity.

To take one of our own wild species. Here is the *Arethusa bulbosa* of Linnæus, for instance. Its pollen must reach its stigma—so he supposed—in order for the flower to become fruitful. But this is clearly impossible, as the pollen never leaves its tightly-closed box unless removed by outside aid, which aid must also be required to place it upon the stigma. This problem, which confronted him in practically every orchid he met, Linnæus, nor none of his contemporaries, nor indeed his followers for many years, ever solved. Not until the time of Christian Conrad Sprengel (1735) did this and other similar riddles begin to be cleared up, that distinguished observer having been the first to discover in the honey-sipping insect the key to the omnipresent mystery. Many flowers, he discovered, were so constructed or so planned that their pollen could *not* reach their stigmas, as previously believed. The insect, according to Sprengel, enjoyed the anomalous distinction of having been called in, in the emergency, to fulfill this apparent default in the plain intentions of nature, as shown in the flower. Attracted by the color and fragrance of the blossom, with their implied invitation to the assured feast of nectar, the insect visited the flower, and thus became dusted with the pollen, and in creeping or flying out from it conveyed the fecundating grains to the receptive stigma, which they could not otherwise reach. Such was Sprengel's belief, which he endeavored to substantiate in an exhaustive volume containing the result of his observations pursuant to this theory.—*Exchange.*

EXTRACTING PERFUMES FROM FLOWERS.

When flowers are gathered for their perfume, no time must be lost in fixing their fleeting perfume. Flowers are gathered early in the morning, before the sun is high in the heavens. They are then taken into the factory and spread upon the sterilized fat, which has the faculty of extracting the scent. This is done again and again, until the fragrance of as many as twelve pounds of flowers is fixed in one pound of fat. The fat, thus charged with

the fragrant essence of the flower, is packed in tins and forwarded to London. The more strongly scented flowers, such as the rose, violet and orange, are treated in hot melted grease, and allowed to cool with it, but in the case of the more delicate blossoms, jasmine, jonquil and tube rose, their petals are laid upon cold fat, spread in glass frames. The scented fat is treated with alcohol 60 per cent. overproof, and kept in a constant state of rotation for three or four days till all the perfume is extracted by the spirit. The spirit is then refrigerated to get rid of the last trace of fat, and elaborately filtered. The perfumes can stand the intensest cold, and are only improved by it, but heat destroys them. Some few essential oils, such as those from roses, orange flowers and the like, are extracted by the aid of heat—distilled in point of fact, but the more delicate and volatile perfumes are fixed by the absorbent powers of fat or grease. The roses of Bulgaria, the lotus flowers of Japan, the violets and jasmines of Southern France come with the lavender of England to attend the chemist's call. Nor is it only from the far famed gardens of the distant East that they come. From the slopes of the Himalayas; from the wave washed strand of the far Pacific come other essences instinct with the life of things.—*Indian Gardening and Planting.*

PLANT NAMES.

An occasional change of language is as exhilarating as a change of air or diet, and herein is one of the charms of rambles off the beaten ways. Sometimes one hears in the current speech of country districts words that in the city are the recognized coin of poets only. Such is the noun "blow" popularly used for a flower in New York State. "Posy," is also an everyday word in parts of Pennsylvania. "What for a posy is that?" is a common question in some sections—a question that preserves a quaint Teutonic idiom in English words, as an insect in amber. In the Adirondacks a marshy meadow is called a "fly," much to your bewilderment if you have never before heard this bit of degenerate Dutch, while in South Jersey a similar place is flatly denominated a "mash." Names of plants are a constant source of interest. In

North Carolina the common laurel is universally dubbed "ivy," and in Western Pennsylvania the wood sorrel, an herb of mountain woods with clover-like leaves that fold at night as though in slumber, is prettily called "Sleeping Mollie." The hand of the arch enemy of mankind is hinted at in the name of many a noxious weed, as devil's grandmother, devil's claws, devil's paint brush, devil's walking stick, and so on.—*C. F. Sanders in Philadelphia Record.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

HORSE CHESTNUTS AS FOOD.—According to recent report, a way has at last been found to utilize the horse chestnut as food. The nut is rich in starch and albumen, and contains some sugar but a certain bitter resin has made it inedible, if indeed, not poisonous as is currently believed. By the new process the nut is powdered and the resin removed by alcohol. The resultant meal is said to be rich in food value, and to have an agreeable taste.

VITALITY OF SEEDS.—The great range of temperature which seeds can withstand without losing their germinating power is remarkable. On the one hand, certain seeds have sprouted after being exposed to a temperature of more than 400 degrees below zero, while on the other, a temperature of 281 degrees above zero did not destroy the vitality of certain seeds exposed to it, in recent experiments,

PRODUCTION OF TUBERS IN THE LABIATAE.—We rarely associate a tuber-bearing habit with species of the mint family (Labiatæ) but half a dozen or more species are known to produce tuberous roots, some of which are edible. The natives of the Soudan make use of the tubers of a species of *Plectranthus* as food and in India *Plectranthus Aromaticus* is commonly known as "bread-and-butter-plant."

AMERICAN TREES IN EUROPE.—European gardeners are cov-

eting the luxuriance of American autumnal foliage and are endeavoring to transplant cuttings of the most vari-colored American trees in their own soil. But thus far those trees which produce the rich purples, crimsons and scarlets have firmly maintained a patriotic determination to beautify only the landscape of their native clime.—*Indian Gardening and Planting.*

The Fringed Gentian.—Anent that fringed gentian and its reputation for taking French leave of the place where one had found it last year,—I know one station for the plant near Philadelphia to which it has been faithful for eight years, to my knowledge. That, by the way, is the only station for it that I do know —it appears to be a rarity nowadays about here.—*C. F. Saunders.*

Natural Chewing Gum.—In a little book now out of print, Maurice Thompson relates that he once went to school where everybody chewed sweet gum, except the teacher, who chewed tobacco. This sweet gum is an exudation from the trunk of *Liquidambar styraciflua* occuring most plentifully where the bark is injured. It appears in crystal-like drops and after hardening in the air, needs no further preparation for chewing. In its flavor there is a faint terebinthine element, reminding one of spruce gum. Sweet gum is highly prized by Southern children, and was of enough importance to the scientist to become embodied in the generic name of the tree.

Perfumes as Antiseptics.—*The Lancet* is authority for the statement that the essential oils are powerful antiseptics, often not very inferior to carbolic acid itself. It is explained that these oils absorb atmospheric oxygen, forming unstable compounds which readily lend oxygen for the work of purification. Turpentine, pine oil and eucalyptus oil are mentioned in this connection and are suggested as accounting for the salubriety of pine and eucalyptus woods. Apropos of this subject, it is interesting to note that in some recent experiments in repressing the omnipresent mosquito, various odors were used with marked success, the principal ones in the order of their efficacy being oil of turpentine, iodoform, menthol, nutmeg, camphor, garlic, pepper and

napthalin. The virtues of oil of sassafras in keeping away mosquitos are well known.

Cinnamon Fern Fruiting in Autumn.—In Florida our well-known cinnamon fern (*Osmunda cinnamomea*) has a curious trick of bearing a crop of fruiting fronds in Autumn. According to a writer in the January *Fern Bulletin* nearly or quite one-half the plants in some places show this fall crop of fertile fronds.

The Barberton Daisy.—The Boer war is probably responsible for bringing into prominence a very interesting South African plant known as the Barberton or Transvaal daisy (*Gerbera Jamesoni.*) The plant is not common as yet in cultivation, but is likely to soon become a familiar sight in the flower garden. The flower is described as daisy-like in appearance, often four inches across and bright scarlet in color.

Self-Pruning of Woody Plants.—A few of our common trees have the remarkable habit of forming cleavage planes in their branches whereby certain twigs are cut off toward the end of the growing season, effectually pruning the plant. These cleavage planes are very conspicuous in one of the common aspens (*Populus grandidentata*). Prof. J. H. Schaffner has been looking for these cleavage planes in other trees, and in the *Ohio Naturalist* for January, notes that they occur in the cotton wood (*Populus deltoides*), black willow, white oak, *Rhamnus lanceolata, Quercus platanoides* and others. This self-pruning is sometimes but not always a family characteristic. The common elm (*Ulmus Americana*) and *Ulmus racemosa* possess the habit, but the slippery elm (*U. fulva*) does not. Others trees, among which may be mentioned the wild cherry and hackberry, cut off their fruit spurs in this way, after the fruit has fallen. The willows are very noticeable for this self-pruning habit, and in many species the twigs are often cut off before the growing season is ended and while the leaves are still green.

Value of Botanical Studies.—The famous Monravian writer, Amos Comenius, over 250 years ago, gave vigorous ex-

pression to the conception of living, objective teachings of the sciences. He said: "Men must be instructed in wisdom so far as possible, not from books, but from the heavens, the earth, the oaks and the beeches,—that is, they must learn and investigate the things themselves and not merely by observation and testimonies of other persons concerning the things." The modern university student of Botany puts his elders to blush by his minute knowledge of some small point in vegetable histology. But he can tell you little of the contents of a country hedgerow, and if you put an unfamiliar plant in his hands he is pretty much at a loss how to set about recognizing its affinities. Prof. Henslow, a famous teacher of botany, was probably the first to introduce into the botanical examination for degrees in London, the system of practical examination. He always held that a man of no powers of observation was quite an exception. He thought and proved that botany might be used "for strengthening the observant faculties and expanding the reasoning powers of children in all classes of society."—*M. E. M.*

Tropical Plants in Florida.—It is possible that in the not far distant future, Florida will be noted for several other exotic fruits besides oranges. From a paper read before the American Pomological Society at Buffalo last September, we learn that Southern Florida will grow almost any fruit that can be produced in the West Indies. In Dade and Monroe counties the cocoanut and guava grow wild. That delicious fruit, the mango, takes kindly to the soil, as does also the alligator pear (*Persea gratissima*), which is beginning to be much used as a salad fruit. The date does well in favorable situations, and bananas, lemons, grapefruit and limes are common, of course. Among other and less well known fruits that have been proven easy of culture in proper situations are the pawpaw (*Carica papaya*), the sapodilla or naseberry (*Achras sapota*), the marnwell (*Marninea Americana*), the sour sop (*Anona muricata*), the cherimoya (*A. cherimolia*), and the sugar apple (*A. squamosa*). The apples, pears, cherries and the bush fruits of higher latitudes, however, are missing from the localities that are suitable to these foreigners.

EDITORIAL.

Although spring, according to the almanac, does not begin until some days after the date of this number of the BOTANIST, in all but the most northern of the Northern States, indications of the approach of a milder season have already begun to multiply. It is a rare season when the maples, elms, alders and willows are not showing bloom as far north as New York by the middle of March, and if we are unwilling to class these among legitimate wild flowers, a search along the sunny fence-rows is pretty sure to be rewarded by a few venturesome blossoms of such early species as the hepatica, dandelion, bluet and anemone. April brings the trailing arbutus, the blood root, the spring cress and a few others, and after April the host is too great to number.

In lands where winter serves only as a slight check to the blooming season the inhabitants appear not to possess the desire to hasten forth to pluck the firstlings of the year that animates those in climes where winter is more rigorous and where these early blosoms in addition to their grace and beauty bear the first real promises of a milder season. That it is something more than the beauty of the flowers which attracts us to these early specimens may be seen in the fact that those who rarely go afield for flowers in midsummer may be found scouring the thickets and hillsides at arbutus-tide.

It may be predicted with something like certainty, that among the first of our wild flowers to be exterminated, will be such of these early blossoms as have not a tenacious hold upon life. In the vicinity of cities and towns the arbutus is already doomed, and the bloodroot and Dutchman's breeches seems likely to share the same fate, but it may be doubted whether the adder's-tongue, spring beauty and violet will give up so easily. It is nearly impossible to pull up entire a blooming adder's-tongue, and the stems of the spring beauty are usually too lightly attached to the flat tuber to bring it with them when pulled from the soil. Num-

bers, alone, protect the violet. Even the farmer with plow and hoe can hardly dislodge them. Let him plow them under and cultivate his crops in their stead, and in autumn he shall find violets blooming again in the midst of his corn field.

While it is a good thing to have societies for the protection of the native plants that need it, it would seem equally desirable for such societies to give us lists of the plants which can do without their help—plants of which we may pull up as much as we please without feeling guilty of thus spoiling somebody's pleasure the following season. The list at best cannot be perfectly arbitrary from the fact that the necessity for protection depends somewhat upon the locality. The white trillium is scattered through some of the remote forests with an extravagance that seems almost wasteful; in other localities it is as rare as an orchid. But orchids are rare only near cities. On the borders of mountain lakes far from civilization, there are often to be found acres of *Pogonias,* and *Calopogons* and the small purple fringed orchis is frequently nearly as common.

There are certain people in every community who must pick flowers if they enjoy their outing, measuring their happiness somewhat by the number of rare blossoms they have been able to obtain. Such people, however, can scarcely be said to enjoy the flowers—they only enjoy picking them. A spray of columbine growing from a cleft in some gray rock, a water lily riding at anchor on the surface of the lake, or the mountain laurel filling the underwoods with a cloud of bloom, have a charm in their habitat that he who removes them vainly attempts to bring with him. The truest enjoyment of the flowers, after all, is to be found only when they nod from their own stalks in their chosen environment.

BOOKS AND WRITERS.

—John Coleman Adams, the author of "Nature Studies in Berkshire," has written a life of the Artist-Naturalist, William Hamilton Gibson, which has just been published.

—The friends of American forestry have reason to rejoice at the unusual number of books on our native trees that are being issued. Within the past year no less than six different books on this subject have been published or announced to be published. The trees stand in such close relation to the daily lives of most of us that we can scarcely have too many books about them. In winter, when frost and snow have banished nearly all the other attractions of the countryside, the trees not only remain excellent objects for study, but assume new phases of attractiveness that were unperceived when their branches were clothed with verdure. New and striking characteristics appear in even the most familiar species, and we run some risk of passing old favorites without recognition. Certain species, there are, that may be easily distinguished at any time of the year, but in winter the majority require for their identification, a greater familiarity with bark, and branch and bud and leaf-scar, than many, save the woodsman, possess. It was, therefore, a happy thought that inspired Annie Oakes Huntington to write "Studies of Trees in Winter." The book contains just the information necessary to enable us to recognize all the native trees of Northeastern America in their leafless condition, but it does not stop with a description of the winter aspects of the trees. All of the interesting or characteristic points about each species are noted and placed before the reader in attractive form. The author's comprehension of her subject is well shown in the following quotation from the section on the hop hornbeam. "There is but one native hop hornbeam in New England, and it is an extremely interesting little tree. It grows under other trees in the forest and is easily overlooked, usually being mistaken for a young elm. Of all trees the hop hornbeam is most retiring in its habits and takes much the same place among trees that the hare does among animals, or the violet does among flowers, living a secluded life in wild places where the woods partly conceal its identity." There are many excellent illustrations from photographs of the trees in winter, and twelve colored plates of twigs and buds give the color characteristics of numerous species. The book is a 12mo. of 200 pages and is published by Knight & Millet, of Boston.

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VOL. II. APRIL 15, 1902. NO. 4

NOTES FROM OHIO.

BY ALMON N. ROOD.

Last November, in company with a botanical friend, I was exploring a small brook in Portage County, Ohio. We descended a steep bank at the foot of which a hidden spring spread its waters over the surface of the ground and here in the open bog we came across a number of plants of the, with us, very local fern, *Dryopteris cristata*. Though so late in the season that severe frosts had nearly denuded the trees of foliage, yet many fronds, especially the fertile ones, remained green and fresh, so that a number were collected for herbarium specimens. A peculiarity of this fern especially noticeable, was the position of the pinnae, nearly all being situated with the plane of their surfaces at nearly a right angle to the general plane of the frond. *D. cristata* is one of the pleasant surprises that await us occasionally in unexpected places and never fails to attract the attention of the plant lover, its narrow, graceful fronds and rich deep coloring, combining to make it conspicuous among its other plant companions.

On the same date and in another part of the same county I left our buggy to examine a clump of papaw trees (*Asimina triloba*), and in the thicket found clinging to some vines a bunch of purplish black berries which looked unfamiliar. An examination on the return home revealed them as the fruit of the moonseed (*Menispermum canadense*), which, while not by any means a rare plant here, seldom produce fruit in any very noticeable quantity. A bush of *Viburnum lentago* covered with clusters of dark purple, papery fruit, was also found in the same locality and many seeds and berries of more or less familiar plants lent a pleasing variety to the store of botanical "catches" for the day.

The late fall and winter months seem to many botanical students to be devoid of interest, because of the general impression that plants are to be associated only with spring and summer, yet some of the most interesting plant history, i. e., that relating to their seeds and the methods of their dissemination, are best studied during the winter months. One of the most interesting field days I spent last season was during a severe cold spell in the latter part of December when the streams were so frozen over as to make travel on the ice an easy means of access to certain marshy tracts lying at the head of what is known as Beaver Pond. Here, on a typical winter day with a stiff breeze blowing and the snow falling about me, I gathered more seeds of marsh plants from the stems above the snow than I had been able to obtain all the preceding fall. Here, too, I could observe the feeding of numerous small birds upon the various stores thus abundantly supplied by nature and among many one could note preferences for certain kinds, while others more conspicuous, were left undisturbed. What bird feeds upon the berries of *Ilex verticillata?* Though the fruit is abundant and the color so strikingly handsome and alluring, being one of the most conspicuous of bushes in winter when the ground is covered with snow, yet I seldom find birds feeding upon it. This and many other questions concerning the colors of various fruits and berries and their preference by certain birds as well as the means of seed dissemination occurring among various plants in winter, can not help attracting the attention of the careful observer besides furnishing abundant opportunity for field study at a season when there is ample time and inclination for the work.

SPRING IN THE SOUTH.

By Willard N. Clute.

Every locality has its own Spring, or rather, its own phase of spring. The marsh, the sand barren, the river valley and the upland alike feel the thrill of an awakening season, but each responds to the impulse with a flora of its own. And just as the flowers vary in shape and hue from seashore to mountain top, so

do they from the equator to the poles. To one like myself, whose rambles have always been taken in the fields and woods of the Northern States, every flower that is now springing in this southern land is an object of interest, and the study of the various features in which they differ from their northern kindred, a most fascinating pastime.

One of the first things to impress the visitor, is the absence, not only of the identical species that make the Northern spring gay, but of any plants of the same family. Arbutus, hepatica, bloodroot, anemone, spring beauty, trillium, adder's-tongue, Dutchman's breeches, Solomon's seal—all these are missing. The composites have a much larger representation than they do further north, although the humble dandelion is not to be found. The sow-thistle is one of the first spring flowers, but this distinction has not relieved it of its weedy qualities to any extent. Thistles of the ordinary kind are blooming, too, but they are of such sharp and forbidding appearance and so much more clumsy than even the northern bull thistle, that I have not felt inclined toward a closer acquaintance. Of other composites with greater claims to beauty must be mentioned a *Helenium* with large daisy-like flowers which spread a yellow light in moist places, and the *Chaptalia,* whose smaller white flowers have the odd habit of assuming a horizontal position with ray-flowers forming a funnel over the disk until ready to open.

Although *Viola* is a genus of the North, there are both blue and white violets here, but I have seen no fields in which they grow in sufficient numbers to give a separate note to the color-scheme. They appear here and there, a few plants at a time, and never very noticeable. Another northern genus, the willow, is but sparingly represented. The principal, if not the only, one seems to be the black willow. The pussy willows would no doubt find this too warm for their furry wrappings. The daisy flea-bone (*Erigeron annuus*) is so common in New York that in spite of the fact that it is of European origin, I had come to look upon it as a typical plant of the northern spring; but here it grows more abundantly than I have ever seen it elsewhere, and with another composite,

a species of *Senecio* allied to our golden ragwort or squaw-weed, forms almost the entire noticeable flora in the vicinity of New Orleans. This may sound strange to many until it is known that the city is surrounded on all sides by the gloomiest of cypress swamps. To reach the nearest lands supporting the true southern flora, one must travel at least thirty miles. Only in "the piney woods," as the expression is, can one find flowers worth the gathering at this season.

In every locality there are certain species, which, by their beauty or fragrance, or abundance, attract more than ordinary attention, and stand as a series of floral milestones to mark the progress of the passing year. The arbutus, rhododendron, water-lily, golden-rod, and the witch-hazel at once come to mind in this connection. The first of such species in the piney woods is the yellow pitcher plant (*Sarracenia flava*) which at Easter-tide is at the height of its season. Unlike our northern plant (*S. purpurea*) it does not seek the seclusion of sphagnum bogs, but grows almost anywhere, if the soil is wet. The great yellow flowers are exact duplicates of those of the northern species, in shape, and measure four or five inches across. They do not easily wilt and are frequently gathered for bouquets. The cylindrical leaves, broadest at the apex, are often a foot long and stand nearly erect. From their shape they are frequently called "trumpets," and I find various musical notes can be produced from them by blowing in the right way. I have also heard them called "Indian pipes."

Scarcely less noticeable are the flowers of the butter-wort, butter-cup or bog violet (*Pinguicula lutea*) which flourishes in any moist spot. These bell-shaped blossoms of clear lemon-yellow are singularly handsome, but picking them is not an agreeable occupation, owing to the fact that the scapes are covered with the same slimy exudation that is found on the leaves. It gives one a creepy feeling to grasp a plant whose digestive juices are on the outside. It seems to prey upon much smaller game than does the pitcher plant or sundew. Only tiny gnats were found in the impromptu stomachs which the plant forms by curling over the edges of its leaves.

Here and there among the pines, a change of soil or the shallow valley of a meandering brook gives various broad-leaved plants a foothold and then one is pretty sure to find the dogwood and azale a. The last flowers were falling from these two the first week in April, but others are opening further north, and, in fancy, we can see this rose-crested wave of white slowly passing northward until it breaks across the hills of the Middle States a month later and goes on to spend itself in Canada. With the dogwood blooms the anise-tree (*Ilicium Floridanum*) whose large starry crimson flowers clustering among the dark glossy leaves make the copses good to look upon as we marvel at the laws of Nature which confines this species close to the Gulf and allows the dogwood the freedom of a continent. A good rich crimson is a rare color among American plants and it is all the more surprising in the anise-tree when it is known that this is closely related to the snowy magnolias.

Taken at its best, the southern spring compares unfavorably with the season a thousand miles further north. Flowers there are in plenty, if we choose to look for them, but they are never scattered with such prodigality as they are in New York or New England. I have seen nothing to compare with our fields of bluets, meadows of buttercups, woods of hepaticas or swamps of marsh marigolds. The south is a land of flowers—the number of species is large,—but so luxuriantly does everything grow that the flowers seem lost among the all-embracing green. In June, in the Middle States there comes a lull in the blooming season, this being the season when the spring flora ceases and the summer flora begins. March and April in Southern Louisiana are very much like it; one feels that with so much verdure there ought to be more flowers.

If nature has not done much for New Orleans in the way of flowers, she has only made man's work show the better by contrast. Such pansies as have appeared on the lawns during the past two months, grow only in an equally moist and genial climate. I have never seen anything to approach them in the North. At present one sees in cottage gardens whole rows of red Amaryllis

and in waste places clumps of the same species growing half wild. The beds and borders are gay with hosts of common blossoms, and as for the roses, they are so abundant that notwithstanding their beauty, they run some risk of being overlooked and their presence considered a matter of course. Everywhere the China tree is displaying its drooping racemes of lilac-tinted flowers, while the magnolia, casting off its two downy sepals as the bloodroot does, is unfolding the first of its great white blossoms, like a clean page upon which to write the history of the early summer, whose arrival its blooming portends.

USES OF THE PAPER MULBERRY.

The paper mulberry is usually cultivated for ornament in the United States, but in other lands its usefulness is its chief recommendation. The tree is called *Morus papyrifera*, or *Broussonetia papyrifera*, and is closely allied to the common mulberry. It grows wild in China and Japan and also in many of the islands of the Pacific ocean, where the natives manufacture a large part of their clothing from its bark. The most important use of the bark, however, is in making the peculiar whitey-brown Japanese paper with which most Americans are more or less familiar. The manufacture of the paper and some of the uses to which it is put, are thus described in *Indian Gardening and Planting*:

A mulberry plantation resembles very much a grove of our willow trees, the mulberry having a very short thick stem with many branches. In November, when all the important products, such as tea, rice, beans, etc., have been harvested, the Japanese farmer finds time to cut the branches of the mulberry tree. The first operation is to boil these branches in a weak wood ash bath in order to loosen the outer layer of bark. After the latter is removed, the bast is peeled off and thoroughly washed by suspending it in the river. The bast is then dried and sold to the papermaker. In our paper mills the pulp is prepared by grinding almost any fibrous material in the beating machine until sufficiently fine, whereby it cannot be avoided that the fibres are cut short. The Japanese, on the contrary, are very particular about treating the mulberry bast

in such a way that the fibres retain as much as possible their original length, and this, of course, is the reason for the excellent strength of their paper. The bast is placed on a flat and level granite stone, moistened with water and beaten with wooden hammers until thoroughly fine. The paper is, of course, made by hand, and by shaking the sieve only in one direction, which is almost the rule in Japan, the fibres place themselves nearly parallel. This accounts for the fact, that the Japanese paper can only be torn straight in one direction, at the same time possessing a remarkable strength in this direction.

In China and Japan paper is a far more important and far more generally used article than with us, owing to its superior quality and strength. The Japanese always has a supply of paper sheets in his sleeve pocket. If he wants a bit of string he twists a strip of paper together. I have had an opportunity in the railway carriage of seeing a Japanese do almost the impossible with a bit of paper string, such as tying up his trunk with the remains of a letter. In Japan, paper not only takes the place of our window glass, but even of our doors and walls.

If the Japanese or Chinese paper is impregnated with Ye-no-abura, the oil from *Perilla ocymoides,* the Japanese substitute for boiled linseed oil, it becomes perfectly waterproof. It is used for making umbrellas and macintoshes. Perhaps it will interest you to know that during my stay in Japan I never had an umbrella or a macintosh. If it happened that I was caught by a sudden shower, and this happened very frequently indeed, I went into the next paper shop and bought a macintosh of oil paper for 2d. (4 cents). The same with umbrellas. If the paper is oiled and varnished, then it takes the place of leather; the roofing of the jinrickshas, the little hand-carriages, is often made of paper, even the Japanese "tab" for rainy weather, the equivalent for our water boots, is made of paper.

FERMENT ACTION IN PLANTS.

Besides our British insectivorous plants, there are other families abroad which include such fly-catching genera as *Sarracenia,* of

North America, and *Nepenthes,* the pitcher-plant of the East Indies, etc. The question arises—How is it that plants of no affinity have acquired this common property? Though it is difficult even to guess how the widely different structures came into existence in each case respectively, we may safely attribute it, at least in a general way, to protoplasm, which is the same in all plants and animals. Hence, whatever the causes may have been which excited it to develop insectivorous structures, it is not surprising to find such in plants of no relationship beyond the common bond of vegetable life bound up in the living protoplasm. We have seen that when any nitrogenous matter is placed upon an insectivorous organ a digestive fluid and an acid are secreted in an exactly comparable manner to the behaviour of our own digestive apparatus.

Now, there are several instances known where this is effected among plants quite apart from truly insectivorous habits at all. Thus, the papaw tree of the West Indies, etc., has large leaves not unlike those of the fig, and pear-like fruits. It has long been known, and, indeed, used for the purpose, that if tough meat be wrapped up in the leaves or rubbed with the cut fruit it becomes tender. A fig leaf will answer the purpose as well. The fact is that the presence of nitrogenous substances stimulates the protoplasm to secret the digestive fluids, and the making the meat tender is really due to what might be called "incipient digestion."

Knowing this common property of protoplasm, Dr. M. T. Masters placed fragments of hard boiled white of egg in the little nectaries of the Christmas rose. After a certain time they exhibited the usual feature of "aggregation" in the cells of the nectaries always seen when insectivorous plants have consumed their prey. This experiment proved that incipient digestion had been set up, though, of course, these honey-secreting organs are not naturally insectivorous at all.

The butterworts derived this name from the fact that they will curdle milk, they are used in Lapland for making a cheese-like substance from the milk of the reindeer. Our common Lady's bedstraw (*Galium verum*) with yellow flowers possesses an analogous property, and has long been used as a sort of vegetable ren-

nent in cheese making in certain places in England. But the secretion of ferments is carried on in all plants quite normally, as a few instances will show.

When seeds are about to germinate the reserve food-materials contained either in the external endosperm (as in a wheat flour) or within the cells of the cotyledons, as of almonds, pears, and beans, consist of solid substances as starch and aleurone or liquid as oil, but in all cases they are unassimilable. Before the embryo can make any use of them they must be converted into a liquid state for absorption. This is done by means of ferments or "enzymes." by which starch is converted into sugar, and aleurone into peptones, etc. A precisely similar process has to be gone through when a potato tuber sprouts, and its starch is to be utilized for growth.

Another case is where secondary roots arise from the mother root. They issue from below, and are therefore called endogenous. They commence as little bulging points which continually elongate till they finally issue out of the surface, raising up the superficial tissues like a collar around them. In passing through the cortex the root makes a hole for itself by *dissolving* the latter in its passage, and at the same time absorbing the nutritious solution for its own purpose of growth. It sometimes happens that the creeping underground stem of couch-grass meets with a tuber or bulb in its course. It does not pass round it as if round a stone, but bores right through the obstruction. In so doing the tip of the stem behaves like a secondary root, and dissolves out a passage for itself.—*The Garden.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

VARIATION IN THE PECAN.—The pecan nuts, so plentiful in the fruit stores, is the fruit of the southernmost of our hickorys—*Hicoria pecan.* The tree is much like other hickorys in appearance, with a rather rough bark, but not so rough as that of the

shag-bark. In the wild state there is great variation in the size of the nut, and also in the thickness of the shell. The nut that comes to northern tables usually requires a nut-cracker to open it; but in its native home it is not uncommon to find trees bearing nuts with shells so thin that they can be easily crushed in the hand. When fresh the kernel can usually be gotten out entire.

How Certain Fruits Ripen.—Everybody knows that when the persimmon appears to be ripe it is not always edible. We must wait until time has taken the astringency out of it. The theory is that in fruits of this nature there is present a certain ferment of "enzyme," which gradually makes it mellow and sweet. Other less noticeable examples of the action of such ferments may be found in the apple, quince and banana.

Abrus Precatorius.—This is the name of a pretty climbing plant with scarlet egg-shaped seeds spotted with black, which is said to be coming into favor in American gardens. The plant is native of India, and, according to *Indian Gardening*, goldsmiths there use the seed as the unit of weight, the *ruttee*. The Brahmins and Buddhists use it in the shape of beads for rosaries; hence the specific name *precatorius*, signifying prayer. The leaves and roots have the same properties as liquorice.

The Prickly Pear in Australia.—Australia seems to be a land that offers superior inducements to any plant or animal of other lands which cannot do well at home. A while ago the meek little rabbit was terrorizing the settlers, and now the prickly pear (*Opuntia*) is having the same sort of vogue. So alarmed have the planters become that the Department of Agriculture of Queensland is to offer a substantial reward for the discovery of some means of eradicating the plants. From our knowledge of the prickly pear, it would seem that if the plant spreads rapidly enough in Australia to be a menace to farming it must have greatly altered its habits on going abroad.

The Camphor Tree.—A large number of young camphor trees are growing at Audubon Park in New Orleans, and are of unusual interest to the botanist from their close resemblance to our

well-known sassafras. The bark of branches and twigs is of the same yellow-green hue and has a taste and smell not very different from sassafras. No doubt if a person familiar with the taste of sassafras were given a piece of camphor bark to chew without knowing what it was, he would call it sassafras. The leaves of the camphor tree are small, rather oblong and pointed, much more like the conventional laurel leaf. Readers need scarcely be told that both these species are true laurels and in no way closely related to the rhododendrons and kalmias.

Prolonging the life of Individual Blossoms.—A flower is simply a means to an end—the plant's device for setting a new crop of seeds. So persistently do the plants obey the natural law to be fruitful, that simply removing the flowers as they fade will often cause a species to continue longer in bloom. Similarly when pollenation is in any way prevented, the blooms remain upon the plant for a much longer time than usual, waiting in the hope of receiving pollen. Apropos of this a writer in *Park's Floral Magazine*, relates that by removing the pistils from tulips, the flowers remained a much longer time unwithered. This subject is one upon which more light might conveniently be shed, and is recommended to any botanist with leisure. Some of our native wild flowers with good sized pistils would be best for experiment. It would be very interesting to know how much longer flowers from which the pistils have been removed remain open than the flowers not subjected to this treatment, but who knows how long the flowers of a single species usually remain open?

New Botanical Terms.—Little by little the way of the botanizer through modern literature is being made harder by the adoption of new ways of calling old things. In the *Ohio Naturalist* for March, Professor Schaffner proposes several unfamiliar terms. Any specialized part of a branch which bears the sexual organs (usually pollen and embryo seeds) should, he says, be called a gametophore, and that the gametophores may be either antheridiophores, archegoniophores, or oogoniophores. In the new botany, however, "the flower is a modified spore-bearing branch without

sexual organs." The flower may be either monosporangiate or bisporangiate (that is, with both pistils and stamens or lacking one of these organs) and the monosporangiate flower may be microsporangiate (staminate) or megasporangiate (pistillate). For stamens and pistils the terms androecium and gynoecium are proposed. The structure which develops when the pollen grain falls upon the pistil is to be called the male gametophyte, while the ovule is the megasporangium. All this may be good enough for the scientist, but it will scarcely impress the flower-lover as inviting.

The Sunflower as an Economic Plant.—The first year of the Twentieth Century closed with a curious sale on the Baltic of a cargo of sunflower seeds. Though a small trade has been done in sunflower seed for close on two hundred years, this transaction was the first in which a whole cargo—300 tons from Odessa—was dealt with. In Russia, where the cultivation of the sunflower and the manufacture of oil from its seed is conducted on a large scale, the Grandiflora is the variety grown. The species rises in a slender stalk 5 ft. high, producing one monster head, the average yield being as much as fifty bushels of seed to the acre. So rich is it in oil that that quantity of seed will yield fifty gallons of oil, while the refuse of the seed, after this quantity of oil has been expressed, weighs 1,500 pounds when made into cattle cakes. Few people in England or India who grow the sunflower for ornament have any idea of its usefulness. It is among neglected crops in which there is money, as is shown by the price paid a few days ago. Besides the seed, every other portion of the plant can be utilized. The leaves furnish an excellent fodder, while in Russia the stalks are prized as fuel, and their ashes, which contain 10 per cent. of potash, are readily sold to soapmakers. Naturally, in Russia the chief virtue of the sunflower lies in oil contained in its seed. The oil is of a clear, pale yellow color, almost inodorous, and of an agreeable mild taste, so that it is in great request as a table article. Why sunflowers are not cultivated on an extensive scale in this country it is difficult to

say. Poultry and cattle like the seed either in its natural state or crushed and made into cakes. No plant produces such fine honey and wax; when the flower is in bloom the bees abound in it. —*Indian Gardening.*

Fruit of Trailing Arbutus.—For every person who has seen the fruit of the trailing arbutus, there are thousands who have seen the flowers; and yet the seed is apparently not very rare, although most botanists seem to think it is. In clumps where the flowers are ungathered, the flowers rarely fail to set seed. The fact that the botanists' attention is attracted in some other direction when the seed is ripe, probably accounts for his failure to notice it.

The Cow Pea in the South.—The cow pea's botanical name is *Vigna sinensis,* and although commonly called a pea, is correctly speaking, neither a pea nor a bean, and differs widely from both. To be sure, they all belong to the same family (*Leguminosae*), but so do clovers, alfalfa and vetches. According to De Candolle and other authorities it is a native of India and was cultivated there at least three thousand years ago. There is no definite record of its introduction into this country, but it is believed to have been sent from England to the Oglethorpe Colonies in Georgia about 1734. Its value, even in those days of slow travel, must have been speedily recognized, for by the beginning of the last century the plant was common in all settled parts of the South. It is a native of the tropics,is most at home in the Southern States, but by its readiness to suit itself to circumstances it has developed a large number of varieties, some of which fully mature in the short northern summer. Some sorts mature seed within 60 days from planting; others maintain a vigorous growth for six months or longer, even putting forth flowers till the vines are killed by frost. Some are short, stocky and erect in growth, others rapid climbers; while others train along the ground and send out great masses of vines. The seeds vary in size, color and shape; flat, round, oblong, kidney; black, white, red, purple, yellow, striped, mottled; small, medium, large.—*From "The Cow Pea."*

EDITORIAL.

With this issue we mail bills to all who are in arrears for subscriptions to the AMERICAN BOTANIST, and as the present volume is nearing completion, we also print in the advertising pages, a list of various books and magazines, which readers can obtain at greatly reduced prices in connection with a subscription to this journal for the coming year. This is the season when the flower-lover begins selecting his out-of-door books for the summer, and since he ought in any event to have this magazine, the only one in America that is printed for the flower-lover, he cannot do better than to order all together. The editor's absence in the South has prevented, in some degree, certain improvments intended for the journal, but these, including a series of illustrated articles, will be begun in the new volume. As we have never failed to constantly improve our publications, we hope the beginning we have made with this one will incline all our present subscribers not only to renew, but assist us in making the journal known to others.

Palm Sunday in New Orleans, brings out an unusual crowd to the Catholic churches, especially in the quarter inhabited principally by the French, Spanish and Italians. Everybody who can, goes to church with fresh green leaves to be blessed, in the firm belief that nothing but good luck will come if they are carried home and hung up in the rooms. At St. Louis' Cathedral there was a great throng, but bunches of bay leaves rather than palms seemed to be the proper thing to carry. Here and there were noted the fronds of a cycad (*Cycas revoluta*), but palms were not abundant. Outside the cathedral several individuals did a thriving business in articles to be blessed, made from the young leaves of the palmetto. These leaves make their appearance, folded up like a fan and if taken before the fan is spread yield twenty or more strips nearly an inch wide and two feet long of a bright yellowish white color. From these, ornamental baskets of various shapes are woven "while you wait;" trumpets that may be sounded are made by winding several strips in funnel shape, and numerous other trinkets, showing considerable ingenuity in construction are to be had for a trifling sum.

BOOKS AND WRITERS.

Those who have the least interest in the mushrooms and puff-balls will find the handsomely illustrated "Mycological Notes," issued by Mr. C. G.Lloyd, of Cincinnati, most excellent publications to have, and not the least of their admirable points is that they may be had without a cash outlay! All Mr. Lloyd asks in payment is the puff-balls, especialls the little ones, from your vicinity, no matter where you reside. In addition he is usually willing to name any specimens that may be sent him. The publications consist of observations on our native species of fungi which the author has "made a note of" in his studies, and as such they are far more valuable than so much information from various quarters that is only guessed at. The nomenclature used is of a common sense kind and the references to other sorts, that appear here and there, cannot fail to delight the average botanizer.

"The Cow Pea" is the title of a 60-page booklet that is being sent free to applicants by the Superintendent of the Experiment Farms, Southern Pines, North Carolina. To readers in the Northern States the title carries little, if any, meaning, but it is far different in the South, where cow-peas, or lady-peas, as they are more familiarly called, form a staple article of food. The word pea, applied to this plant, is decidedly a misnomer for the seeds are much more like beans both in taste and appearance. The food value to human beings is not the plant's only recommendation. The tops make a superior quality of hay, and the roots, by reason of the partnership which they have set up with certain nitrogen producing bacteria are regarded as the very best of mediums for restoring the nitrogen to worn-out lands. Instead of decreasing the fertility of the soil, as other plants do, a crop of cow peas actually increases it!

Professor F. D. Heald, of Parsons College, has just published a "Laboratory Manual in Elementary Biology," for use in High Schools and Colleges which cannot fail to be of great assistance to both student and teacher. The older manuals usually state certain facts about each subject and leave the pupil to verify the statements. In the new manual an opposite method is employed.

The pupil is supposed to be supplied with proper material, and then a series of intelligent questions guides him to what to see and how to see it. In this way nothing is taken for granted and when the course is finished it is impossible for the student not to have a good understanding of structure in both the animal and vegetable kingdoms. The book is divided into two nearly equal parts, the biology of the plant being given equal importance with the biology of the animal. The text properly begins with the lowest forms and progresses to the highest. Reference to any part of the work is made easy by a series of sub-titles. The book contains upward of 250 pages, is bound in green cloth and is published by Willard N. Clute & Co., at $1.25.

In the preface to "Blossom Hosts and Insect Guests," the editor, Eleanor E. Davie, claims for William Hamilton Gibson the honor of being the first American to investigate the methods by which flowers are pollenated by insects. At any rate, Gibson did a great deal of work of this kind and being both artist and writer, gave his observations to the world in a number of charming articles in which text and illustration are delightfully joined. In the little book now before us, all that Gibson ever contributed to the subject, either in the way of information or illustration, may be found with just sufficient additions from the editor to form the whole into a logical exposition of cross-pollenation as effected by insects. The book is primarily intended as a supplementary reader for school use, but it is equally good for other people who wish a guide to still further studies of the devices by which the flowers secure the objects of their existence. The author rightly says in concluding "There are similar mysteries to those we have penetrated concealed within the hearts of many of our most common wild flowers and it is one of the most inspiring fascinations of Nature-study, that while rewarding her devotees with a full measure of her confidence, she still allures them on with an inexhaustible reserve." A supplement to the book contains a list of more than 250 of our native wild flowers with the names of the principal insects that visit each species and the means that are employed to secure cross-pollenation. The book is a 12 mo. of 215 pages, published by Newson & Co., New York. The price is 80 cents.

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PLANT MISNOMERS.

BY C. F. SAUNDERS.

The common names of our native plants are frequently names transferred from the Old World. Settlers in this new country, finding here many plants which seemed identical with those they knew at home, would naturally give to such the home names. In some cases these appellatives would correctly designate the plant, but in other instances they would not, for the average tiller of the soil or hewer of wood is not a scientific observer. Thus to quote a familiar example or two, the wild roses of our roadsides and swamps are as true roses as any that Anacreon sung; but the name of wild honeysuckle applied to an azalea is a palpable misnomer which, perhaps, came into being because the azalea is not native to England. When English immigrants saw its pretty flower with long protruding stamens they were apparently struck by some resemblance to the well-beloved honeysuckle of their old home, and named it accordingly.

Not long ago there came under my observation a present-day instance of the latter process of plant-misnaming in respect to the common *Galium triflorum,* which the bookmen call the three-flowered or fragrant bedstraw. One May afternoon, I met in the woods near Philadelphia a man, who proved to be a German, industriously gathering this plant and asked him what he would do with it. He said it was very fragrant when dry and he would use it for laying away in clothes to make them smell sweet, and might also employ it for putting in wine to flavor it. On my asking him the name of it, he said it was woodruff.

Now as every botanical student knows, woodruff is a plant of quite another nature and while common enough in Europe where it is gathered in May for the uses named by my chance acquaintance

it is not indigenous to America. It bears a considerable likeness to the fragrant *Galium,* however, so that the comparison of the two herbs by an untrained collector is not unnatural. To what extent the name woodruff for this *Galium* may prevail in our country, I do not know; but the little incident above related was interesting to me as affording an object lesson in one source of plant misnomers.

Philadelphia, Pa.

SOME APRIL FLOWERS.

By Prof. W. Whitman Bailey.

The first few weeks of Spring are proverbially very fickle. After these, however, though the weather is often uncanny, and even "May is so much like Mayn't," things generally so equalize themselves that the experienced wood-lover can forecast almost to a day, the advent of any particular flower.

Emerson used to cite an example of Thoreau's marvellous instinct, that he would say with confidence, "The *Cypripedium* blooms tomorrow." As a matter of fact it requires no special qualification to assert its coming in the week of the 20th of May. So is it with the *Arethusa* and the painted-cup as well as other vernal flowers.

The writer considers this, so far as wild things go, a fair average year. It started to be precocious but recent cold "snaps" have notably retarded vegetation. Last week we had the pleasure of gathering Hepatica and Dutchman's-breeches in abundance in Westchester, N. Y. The latter charming plant, for some inscrutable reason, avoids Rhode Island, though it goes all around and even far north of us. Up the Hudson Valley it is one of the earliest, as it is one of the most charming of the wild-flowers. We have heard it called "Ladies-ear-drops," a pretty name, but not likely to supplant the homely popular title so vividly suggesting Rip and his lazy companions of Catskill.

The plant is a *Dicentra* or *Dielytra* (as the name became by a misprint), and is first cousin of the "Bleeding-heart" of the gar-

dens hailing from Japan and China. Our plant, though perennial, has a very short period of active vegetation. After blooming in early April, and displaying for a too-brief period its exquisite fern-like leaves, it withers and disappears till another year. Its life is all this long time confined to the small, grain-like bulbs, barely subterranean. The flowers are in racemes on a naked stalk and are creamy white in color. Very curiously constructed, it is the divergent petals, sac-shaped and hollow, that give the plant its popular name. It might be called "white hearts" in distinction from the bleeding *Dicentra spectabilis*.

Both the Dutchmen and Hepaticas love rocky regions. Where I found them this year was on ridges rising from six to eight hundred feet above sea-level, broken and tossed into fantastic forms by ancient convulsions of nature. As I gathered the bonnie gems, reminiscent of happy childhood, I could look far off over Croton Lake, to the distant Highlands and the rolling hills of Connecticut. Surely there is no more beautiful region than Westchester even in surpassing New York!

Another little plant coming up everywhere, is common also here with us, but never the feature that it is in New York. This is the Saxifrage, whose name denotes it a "rock-breaker." Coming up in the interstices of cliffs or cracks of bowlders, it acts very much as does a lichen in disintegrating the minerals and preparing the way for other plants.

The leaves, spatulate in shape, are gathered in a rosette close to the ground. The flowers, small and white, are borne in a cluster at the top of a naked stalk only a few inches in height. When the blossoms fade, the red seed-pods are almost as pretty.

Now comes also the incense-bush, or spice, or fever-bush, a characteristic plant of the season, representing the true laurels. Our so-called mountain laurel, of course, is not a laurel at all. Our spice-bush is cousin of sassafras. Its stem and leaves are indeed spicy to the taste, and are often infused as a simple palliative of fever.

Providence, R. I.

INSECT-CATCHING FLOWERS.

No doubt any one who has given much attention to the plants of his or her locality, will have become familiar with one or more species of the genus *Silene,* commonly called catch-fly or campion, the stems of which have a part of each internode covered with a viscid substance to which we generally find adhering various small beetles, flies, aphides, and, occasionally, even Agrionine dragon flies. It is somewhat puzzling to attempt to determine just what purpose this provision serves the plant, unless, as is suggested by the way we sometimes daub a ring of pitch or other sticky matter about the trunks of our fruit trees, it may be effective in keeping certain insects from climbing up the stems to feed on the flowers.

Throughout the more arid portions of Utah and the adjoining states, we find several species of *Mentzelia.* Some of these have large and beautiful yellow or whitish flowers, and there are two kinds at least which, like the evening primroses, open only towards evening; closing again as the morning sun strikes them, while with other species, the reverse is true. These plants are clothed with a fine barbed pubescence that takes hold of the feet of various small insects, holding them securely. An interesting fact in this connection is, that a small spider of the family Attidæ, a handsome and active little fellow, looking like a fleck of shining bronze, takes up its abode on one of these plants (*M. lævicaulis*), and ambles freely over its leaves and stems looking for captives. This spider spins no web for catching its prey, and it is evident that—so long as it is the protege of the *Mentzelia,* it will not require such a web.

Among the weeds of my garden one year, were profusely dispersed clumps of fox tail grass, having a bristly inflorescence that immediately attracted attention by adhering to one's clothing wherever brushed against. Further notice disclosed that these grasses usually had sticking to them a number of "lady bugs" (Coccinnellidæ), lace-wings (Chrysopa), and other small creatures of similar kinds. An amusing incident occurred one morning as I walked among these grasses: There were plenty of

grasshoppers that year, and they were continually springing up from the path in front of me. Suddenly one of them, a large female two-stripe locust, that had not directed her heavy flight correctly, sprang against an over-hanging spike of foxtail. Instantly her gauzy underwings were grasped by the little barbed bristles, and she was abruptly arrested in mid-air. Her weight was sufficient to bend the grass stalk low enough to allow her to get an occasional footing against a spray of weeds, and she continued to vibrate up and down like a child playing see saw, until her struggles detached enough of the bristles to release her, but her wings were a sad wreck.

These few observations all being made in one locality, I have no doubt that many other places would afford numerous and more curious examples of an analogous nature.—*Popular Science News.*

THE WILD GARDEN.

Wild flowers, we are aware, do not appeal with the same intensity to all, and it follows that a wild garden may prove of little interest to many who love flowers, but thinking the subject a worthy one, I have selected it for consideration this evening. A wild garden is not, as many assume, a garden wild, but it is a collection of plants native to a district, planted, arranged and taken care of just as other garden plants are cared for. And a wild garden wild is even more slovenly and deplorable than an ordinary garden wild. I remember an account Prof. Meehan told me some years ago of a visit he made to Mr. Wm. Robinson's place near London. Mr. Robinson was the author of a celebrated book called "The Wild Garden," and the possessor of what was considered an exceedingly fine wild-flower garden. After lunch Prof. Meehan was invited to inspect this garden, and his humorous account of it I shall not soon forget. He told me he did not doubt the plants were there, and that they were all that was claimed for them, but he could not see the flowers for weeds. It is needless to say this is not the kind of a garden we have in mind.

A decade ago it might have been necessary to have directed attention to the fact that a large number of our common wild plants were worthy of place in the garden, and that many of the most beautiful flowering plants were to be found among our native hardy plants.

Now, happily, the study and knowledge of wild flowers has so far progressed that a statement of this kind is no longer necessary. We now have papers and books on the subject innumerable, and in many schools botany is taught. Once, popular wild flower books were few, and persons interested in botany were hard to find. Now the reverse is true.

A wild garden is the best way of studying and knowing plants. By seeing plants grow we become interested and desire to know more. We add to the number and our knowledge increases. In due time we have a respectable collection, and we also have a familiarity with plants which can be gained in no other way. The garden becomes a part of our daily experience, and we may closely observe individual plants throughout their entire existence.

The proper time to transplant native plants varies. The latitude is wide, and success is sure to the observing and the industrious. As with trees and shrubs many prefer to plant in the fall, while others maintain the superiority of spring planting; so it is largely a matter of opinion, or condition, when hardy plants may be moved. For myself, I prefer the fall for hard-wooded plants, and the spring for plants of tender structure. Hard-wooded plants, if moved after the leaves have dropped remain dormant during the winter, and will push without loss in the spring. Ferns if moved in the late fall, if not carefully planted, may dry out, or for other causes may show no life in the spring. I have never had special difficulty in growing any of our native plants. If the laurel or wild honeysuckle be moved during a resting period, and the root fibers be carefully preserved, and when transplanted the soil be pressed firmly about the roots and afterwards properly watered, there will be no halt in the growth, and at the proper season the plants will start as though they were in their original po-

sition. The trailing arbutus treated in the same way will respond the same as the laurel and wild azalea.

Soil, it should be remembered, is little more than a material substance, which a plant uses; that light, air, heat, moisture and subservient chemical properties, which a plant has the power of appropriating and assimilating, are always necessary and ofttimes independent of the soil. Keeping this in mind, we may understand more readily the value of drainage for the admission of needed properties and the necessity of a porous soil, which will serve the peculiar needs of a plant. It may then be seen that all the wild plants will not do equally well together, and that for the greatest measure of success both skill and judgment are required.

One of our earliest native plants, and one of the most eagerly sought for, is the trailing arbutus. It usually will be found in flower about the fifteenth of March, though its period of bloom depends entirely upon the season. The buds being formed the autumn previous open at the first appearance of fair weather. The pale pink refreshing flowers may then be found peeping from a mossy bank, or, inconspicuous as they often are, in hiding near the surface, filling the air with fragrance and "Sweeter than the lids of Juno's eyes or Cytherea's breath." It is a prevalent belief that it is next to impossible to transplant arbutus, and numerous cases of failure I have knowledge of. The failure, I think, is due to a lack of attention, or is a fault in the observance of conditions. The arbutus will be found growing on high banks where moisture is abundant and where the drainage is perfect. In transplanting the greatest difficulty is to find a place where the roots may be kept moderately dry. The great secret in transplanting anything is to press the soil about the roots as firmly as possible, and afterward to thoroughly soak with water. After this the plant should be watered only when necessary. It is, of course, useless to attempt to move arbutus after it has started to grow, but by observing the simple rules given, I several times have transplanted arbutus, and in each instance was entirely successful. Once, however, I destroyed a plant which had been growing eight months by giving it too much water.

Almost without exception our common wood ferns do well in a garden. The beauty of our maiden-hair fern, royal flowering fern, cinnamon fern, Christmas ferns, and of a number of our hardy ferns cannot be surpassed; and I doubt if they can be equaled by any of the aristocratic exotics we sometimes see in glass cases. The ferns I have named, if properly planted, are permanent, and from year to year gain in strength and beauty. All do well in good, well-drained soil, and in a partially shaded place. There are other desirable varieties of ferns to select from, among them several rock ferns.

A wild garden well begun will renew itself, and, if I mistake not, will become the most attractive part of the garden. When once planted such a garden is permanent, and daily increases in beauty, which, as the poet says, "is a joy forever," and joys enjoyed "will never pass into nothingness."—*From an article by Edwin C. Jellett in Germantown Telegraph.*

THE INFLUENCE OF THE POLLEN ON THE MOTHER PLANT.

Every now and then we come across cases in which the action of the pollen is traceable not only in the appearance of the embryo plant, as is of course the common order of things, but also in the conformation or color of the ovary, or of the seed-coats, which are parts of the female plant, and not directly subject to the influence of the pollen. The capsules of certain lilies, and the seed-coats of certain peas, and of Indian corn or maize, are among the best known illustrations of this supposed agency of the pollen. We say supposed, for the phenomena are so extraordinary that their explanation is very difficult, and an attitude of scepticism is fully justifiable. Within the last two or three years, however, discoveries have been made which are thought to furnish a clue to the interpretation of the appearances in question.

To make a complicated matter as clear as possible, we may allude to the action of the pollen under ordinary circumstances. The pollen-tube is known to contain the egg-cell, together with

certain "polar nuclei" and other bodies. When fecundation takes place, one of the two nuclei of the pollen-tube passes out of the tube into the embryo-sac, and there comes in contact with, and fuses with, the nucleus of the egg-cell, which thus develops into the embryo plant.

But, as we have seen, there are two nuclei in the pollen-tube; one is accounted for as just mentioned. What becomes of the other? The answer to this question has been supplied by Nawaschin in Russia, by Guignard in France, and by Miss Ethel Sargent in our own country. From their researches it appears that, as has already been recorded in these columns, there is a double process of fertilization. Both the pollen-nuclei enter the embryo-sac, one to fuse with the nucleus of the egg-cell, and the other with two "polar nuclei" which form the nucleus of the embryo-sac. From this last nucleus, by repeated sub-division, the "endosperm," which surrounds the embryo and supplies it with food, is developed. According to this, then, not only is the embryo-plant the result of the confluence and fusion of nuclei derived from the male and the female respectively, but the endosperm or the albumen of the seed has a like double origin. Now, it is supposed by De Vries and others, that the occurrence of "Xenia," or the direct influence of the pollen on the female plant, may be explained as result of the influence of one of the pollen-nuclei on the endosperm-nucleus. We do not understand how the walls of the ovary (the pericarp) and the coats of the seed can be affected by anything that takes place in the endosperm. Mr. Webber is endeavoring to clear up the matter by experiments with maize, which is peculiarly liable to manifest appearances attributable to the influence of the pollen, and therefore observable, not only in the new seeding plant, but also in the parent mother plant. We often come across parti-colored grains in a head or cob of maize, and the late Mr. Laxton showed us many such cases in the seed-coats of maize. Mr. Webber's experiments, so far as they go, support the conjectures of De Vries, and the experiments of Heari Vilmorin. It is needless to do more than al-

lude in passing to the great importance to horticulture of these experiments. An entirely new aspect is opening up before us, from which the horticulture of the not distant future must necessarily benefit.—*Gardener's Chronicle.*

A GIGANTIC GRASS SEED.

At the meeting of the Linnean Society on 20th March, Dr. Otto Stapf exhibited several seeds of *Melocanna bambusoides*, a species of bamboo, which completely upset the popular idea of grass seed dimensions, the giants of which are presumed to be represented by pedigree wheat and maize, in which latter the huge mass of seeds constitutes, it is true, a very substantial fruitage; the actual seeds, however, are comparatively small. In *Melocanna,* on the other hand, in lieu of a spike arm or cylindrical mass of associated small seeds, we have solitary ones, measuring no less than 5 inches in height, by 3 in diameter, a massive pear-shaped body, the size and form of which are as utterly different from our usual idea of a grass seed as can well be conceived. By what evolutionary process this huge solitary fruit has been arrived at, is not clear, but as might be expected, the great store of nutriment embodied is so large a fruit, favours the development of the associated embryo plant to such an extent, that the first product of germination is a robust growth, which practically secures establishment and continued existence. The single seed is thus fully as efficacious, if not more so, in securing reproduction, than a very large number of small ones, and by its greater individual vigor, would probably have an infinitely better chance of survival in a dense, growing bamboo jungle, where small weakly seedlings would be utterly incapable of reaching the light. This, indeed, is probably the key to its genesis.—*Indian Gardening.*

MUSHROOM FOLK-LORE.

The mysteriously rapid growth of the mushroom and its curious tendency to spring up in rings naturally attracted to it in old times much fantastic superstition. A common country belief in

Shakespeare's time was that elves and fairies danced within the rings at nights, and seated themselves to rest between the dances on the dewy cupolas of the plants. In "A Midsummer Night's Dream" Titania, in her quarrel with Oberon, describing to him the rage of the winds because the fairies dance no more, and the "contagious fogs" which they "in revenge have sucked up from the sea," says that as one result of the spiteful flood "the nine men's morris is fill'd up with mud." This "morris" was the dance of nine men, the gnomes, who were supposed, after their Puck-like expeditions of maliciousness to dance with joy in the moonlit meadows, within the mushroom rings. Even in these enlightened days gardeners are sometimes found who believe that the growth of the mushroom is influenced by changes of the moon.—*Indian Gardening.*

NOTE AND COMMENT

WANTED—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

PROTECTION OF WILD FLOWERS IN ENGLAND.—Our cousins "on the other side" are beginning to agitate for a better protection of their rare flowers and ferns. Under the existing law, several depredators have received exemplary sentences but according to the report of the Selborne Society, a meeting of scientific societies at Canterbury in June, will discuss the advisability of additional protective legislation.

WEED LAWS.—The fact that many of our wild-flowers will never require protection is emphasized by the laws that are constantly being made for their repression. In 1891 Minnesota enacted a law making it a misdemanor to encourage the growth of ox-eye daisy, Tennessee made it a misdemeanor to sell or give away Johnson grass, Texas forbid railroads to allow Johnson grass or Russian thistle to go to seed along their rights of way and Wisconsin, included wild barley among noxious weeds which are to be destroyed.

Otto of Roses.—Absolutely pure otto of rose according to an article in *American Gardening* is said to be unobtainable, that in the markets now-a-days being usually adulterated with geranium oil or of guaicum wood. The value placed upon the otto may be understood when it is known that an acre of ground, producing 2,500 pounds of flowers, yields at best not more than one pound of oil.

A Western Tuber-Bearing Labiate.—The note in the March number in reference to species of the mint family that bear tubers has brought forth additional facts. The editor of *The California Floriculturist* sends us specimens of *Scutellaria tuberosa,* a tiny tuberous-rooted labiate from Los Angeles County, California. It would be interesting to know whether this is the only American mint with this habit.

Attar of Ylang-Ylang.—According to the *Manilla American,* the Philippine Islands produce a perfume that rivals the famous attar of roses. This is the attar of ylang-ylang (*Cananga odorata*) or ilang-ilang as it is sometimes spelled. It is derived from a tree belonging to the custard apple family and the oil is obtained by simple distillation of the petals of the flowers, about 75 pounds of flowers being necessary for one pound of oil. Many more rose leaves are required for one pound of attar of rose. Ylang-Ylang is used as the base for many perfumes, and retails for about fifty dollars a pound.

Two Plant-Protection Societies.—The originators of "the Wild Flower Preservation Society of America" must have great fears for the safety of our native plants to induce them to put a second society for their protection into the field. As competition is the life of trade it is possible that two societies will protect the plants better than one. We wish both all success and offer such assistance as we can give. The board of managers of the society with the long name, is made up of well-known botanists. Mr. F. V. Coville is President and Mr. C. L. Pollard of Washington, D. C., is Secretary. The *Plant World* will be the "official organ."

THE VALUE OF BOTANY.—The importance of the study, as a means of mental discipline, aside from teaching the habit of observation, chiefly lies in the value that must be given to evidence. Facts, often of the must delicate nature, must be weighed to come to a decision. The same process has to be followed, not only by the judge and the statesman, but by those in all the walks of life. Failing to give the proper value to evidence may result in success or disaster, and as far as facts are involved, whatever disciplines the mind for this will be of the greatest benefit in imparting mental habits.—*E. J. Hill, in Plant World.*

A LUMINOUS MOSS.—Taking my way back toward the brook I came to a mass of rocks tilted together in such a way as to form something like a cave; looking down this fissure into the semi-darkness I saw a circle of light about a foot in diameter. Thinking this might be some decaying matter that gave out phosphorescent light, I examined some of it and found I had a very delicate frond-like moss which proved to be *Schistostega osmundacea.* Best, to whom I sent a specimen, put me right as to its luminous appearance, as I had mistaken its light as due to phosphorescence instead of its cells being constructed so as to focus the light rays and then reflect them.—*J. W. Huntington in Bryologist.*

THE GERMINATION OF SEEDS.—Nature has various ways of keeping up the numbers of a given species and one of the most interesting is concerned with the germination of seeds. Some years ago it was shown by careful experiment that the seeds of the homely clot-bur (*Xanthium*) two of which are enclosed in each prickly bur, germinate in successive years, so that if the plant which appears the first year meets with misfortune, there is still a chance for the next year. Of single seeds of other species, it would appear that not all germinate the first year under the same conditions. Some seeds of the partridge pea (*Cassia chamaecrista*) planted in the spring germinated very sparingly, but this year the same bed is producing numbers of the plants without seeds being sown and without having been re-seeded by last year's plants. This shows, apparently, that the partridge peas seeds are in no hurry to grow.

EDITORIAL.

The editor has ended his extended stay in the South, and once more among his books and specimens, is endeavoring to catch up with a sadly neglected correspondence. The interruption due to changing locations is responsible for the lateness of this issue. Future numbers will be out on time as usual.

A writer in the *Botanical Gazette,* reviewing Prof Britton's Manual expresses himself as follows regarding the place the books is likely to occupy: "For the first time, we have a manual presentation of the idea of species applied to the ultimate recognizable segregates of plants. It is now to be tested whether those of ordinary training and experience can determine species in this new sense, or whether the use of a manual must now pass out of the reach of amateurs and be restricted to specialists. For example, can an amateur distinguish the 43 species of *Viola* found in Britton's Manual as he can 18 species found in Gray's Manual; or the 13 pieces of *Sisyrinchium* and the 15 species of *Antennaria* found in the former, as he can two and one species of the latter?"

If by amateur the writer means the novice or beginner the answer to his query is that he most certainly cannot. And the fact that he cannot is much to be deplored. The line between the botanist and the botanizer is beginning to be drawn with no good effects upon science that are apparent. In earlier days the ranks of the professional botanists were largely augmented by those who had first taken up botany as a pastime, but the advent of the new botany has rendered such proceedings obsolete and impossible. The person who is attracted to botany by the marvellous in plant life, the amateur, will now take down his Gray's Manual and go on browsing through field and wood to the end of time, while in a college herbarium will sit the embryo professionals, surrounded by miscroscopes, scalpels, dusty volumes and dead plants, conning the minute differences which distinguish one so-called species from another. It is the tendency of the times and not to be stayed by any protest; but one cannot help wishing that instead of calling

all these obscure forms, species, the newer botany had arranged them as sub-species, varieties and forms, under the old familiar species of the past.

The editor of a so-called journal of popular botany objects to the publication of articles on nomenclature, and kindred topics in journals designed for the plant lover upon the ground that they "must be quite incomprehensible to many of its readers." In this we believe he is mistaken. Our experience has been that any beginner with energy and persistence sufficient to master the identification of plants, is quite intelligent enough to comprehend any article on the names of plants, that may be set before him, provided, of course, it is written in language intelligible to educated persons.

BOOKS AND WRITERS

"The Fern Collector's Guide" is the title of a forthcoming booklet by Willard N. Clute which will be issued by the F. A. Stokes Co., New York.

With the June number, *Nature Study,* Manchester, N. H., begins its third volume. The magazine has won a deserved success and its increase in size is likely to add to its popularity.

The late Thomas Meehan, although a prolific writer, published but one book. His scientific papers and letters, however, are being arranged for publication by his son, the present editor of *Meehan's Monthly.* They will be awaited with interest by all familiar with Mr. Meehan's original and practical views upon botanical subjects.

—A. W. Mumford, of Chicago, the publisher of *Birds and Nature,* has begun the publication of a series of photographs of forest trees that will appeal as strongly to the student of trees as Huntington's "Studies of Trees in Winter" do, though in a different way. Mumford's tree pictures are of the forest trees in full leaf and were made by an expert photographer from representative specimens. Besides a photograph of an entire tree,

each sheet also contains photographs of mature leaves and of the lower part of the trunk, the latter large enough to show the bark-characters plainly. Accompanying each plate is several lines of text, giving information about the range of the species, its size, bark, leaves and wood characteristics. The photographs are among the best that have appeared and form a very instructive series. Thus far, 24 sheets have been issued, the price of the set being one dollar.

A little volume entitled "Elementary PlantPhysiology" by Prof. D. T. MacDougal has just been issued by Longmans, Green & Co. This replaces the same author's "Experimental Plant Physiology" which was issued in 1895 and is now out of print. The present volume follows essentially the same lines as the earlier one, being designed to meet the needs of beginners in physiological botany. The experiments suggested are such as can be made with the simplest apparatus and there are 108 illustrations. One of the best testimonials to the usefulness of this work is found in the rapid sales of the first volume.

Mrs. Parsons' new edition of "According to Season," might have borne any other name, as far as its appearance connects it with the earlier volume. The original "According to Season" was a tiny volume without illustrations but this new one has grown to a size uniform with the author's "How to Know the Wild-Flowers" and "How to Know the Ferns" and becomes a most serviceable book for the lover of nature. There are now thirty-one colored plates reproduced by color photography which are very life-like representations of the plants. Several new chapters have been added and each paragraph now has a margined title. The sub-title of the volume is "Talks about the flowers in the order of their appearance in the woods and fields," but one who reads the book will find that birds and many other things receive a share of attention, the whole making a very attractive and readable volume. It is published by Charles Scribner's Sons at $1.75 net.

..A Reviewer in the Overland Monthly..

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FOR THE PLANT LOVER

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THE AMERICAN BOTANIST

VOL. II. JUNE 15, 1902. NO. 6

FASCIATION.

BY PROF. WM. WHITMAN BAILEY.

It is not an uncommon thing—especially in wet seasons—to see manifestations among plants of what is technically known as fasciation. The term is derived from the Latin *fasces,* meaning a bundle of rods, such as with the axe, were carried by thevictors. To this day we frequently see the symbol in courts of justice.

The technical term as applied to plants might be translated "bundling." It results from the growing together—or coalescence of several or many buds when in their nascent state. This changes the whole subsequent appearance of the plant. Instead of the usual cylindric stem, the axis becomes flattened and assumes a ribbon-like appearance. Even the flowers partake of the distortion, and the leaves are projected on a vertical plane instead of in a spiral. This helps to throw some confirmatory light on the accepted theories of phyllotaxy or leaf arrangement. The old-fashioned flower known as "cocks-comb," is the result of fasciation in a kind of amaranth maintained and perpetuated by seed. Generally the forms would revert in perennials to the race characteristics.

The phenomenon has been observed in a great many species of plants both herbaceous and woody. Thus, the writer has himself seen it in the bulbous and tall butter-cups, in the white-weed, in the cone-flower or *Rudbeckia,* in both the native and introduced *Linarias,* like the butter-and-eggs, and in asparagus.

A very striking specimen of fasciated *Rudbeckia* was sent me this week from Shannock. It was about two feet high, two inches broad in the widest part, but everywhere thin like a ribbon. Instead of the usual conical heads, these become arched in a most peculiar way. Maxwell T. Masters catalogues at least 150 plants

which now and then exhibit fasciation. He says it is one of the most common of plant malformations. "Very generally the surface is striated by the prominence of the woody fibres which, running parallel for a time, converge or diverge at the summit according to the shape of the branch. If the rate of growth be equal, or nearly so, on both sides, the stem retains its straight direction, but it more generally happens that the growth on one side is more rapid and more vigorous than on the other, and hence arise that curvature of the fasciated brand so commonly met with —as in Ash, wherein it has been likened to a shepherd's crook."

Providence, R. I.

THE MANDRAKE.

By Bessie L. Putnam.

"A flower shaped like a rose, with petals of waxen white, and such funny leaves." This was the description given by a child of a new plant found in the edge of a cemetery adjoining an old oil town of Northwestern Pennsylvania. On being questioned regarding the chances of its being an escaped plant, she was firm in her convictions that it was wild. We were then on a rocky hillside some two miles from the spot where her treasure was located, there to gather the mountain laurel, with which the sterile hills were covered. And as my own thoughts were concentrating on a plan to view her plant beauty she gave a scream of delight and triumphantly held up a mandrake leaf.

It must be confessed that to one who had played with mandrakes in childhood this unexpected materialization of imaginary camelia-like blossoms brought a tinge of disappointment. But the child guide was happy in her treasure though it was only a leaf, and I,—well, I was glad to be saved the fatigue and ridicule that would have folowed the long walk for "only mandrake blossoms."

And yet the plant is a most interesting one, her picture being, on the whole, not overdrawn. Her comparison was with a single rose instead of a double one, and as for the waxen petals of

creamy white, few flowers can boast of more exquisite garb. The entire plant, viewed from the standpoint of the botanist, is of unusual interest, and even the most casual observer admires the blossom and leaf.

It is a perennial, frequenting rich woodlands and roadsides, and known also as May-apple, wild lemon and racoon-berry. The thick, fleshy stems and bright green leaves with their veining of white, are among the conspicuous features of returning spring, The barren stalks are centrally peltate, forming excellent toy umbrellas for the little folks, who quickly improvise dolls to carry under their shade by simply taking a similar leaf binding the lobes down and passing bands of grass around at suitable spaces for neck and belt. The flowering stems are always forked, with leaves lobed and attached near the base. In the fork of the stem is found the single flower on a stem about one inch long.

The flower's outer cloak is cast aside at expansion and may be sometimes seen clinging to the top of a petal. The petals vary in number from six to nine, and there are always twice as many stamens. The latter are tipped with light yellow anthers opening by slits in the side, and contrasting beautifully with the waxen petals. Within is the creamy ovary tipped with a yellow stigma, and so large as to suggest the lemon-shaped fruit into which it develops.

The fruit is often two inches long, with a thick rind and an odor suggestive of strawberries, apples, musk melon and paw-paw. The taste is relished by some but to most people it is nauseating. The seeds are clustered on a ridge running lengthwise of the "apple," and by removing the yellowish outer skin the albumen store of food is seen.

The flowers are usually at their best about the last of May in middle latitudes, and are conspicuous among the Memorial decorations. They are of short duration, however, and if rain or dew wet the petals they lose their waxy consistency and become almost transparent. Unfortunately, the odor is anything but pleasing.

Buds opened at various stages of growth suggest some interesting points. If we open one say a week before its time we find the

stamens and pistil far advanced in formation, the petals—of no positive necessity to the plant's welfare,—very much shorter. Three or four days later the petals have become about as long as the stamens, and when the flower opens they are fully twice as long. It is as if Dame Nature realized that the stamens and pistil were necessities, and resolved to make them first, and then expend her surplus energyq in the ornamental.

If we dig into the earth at blooming time a new bud will be found near the old one on the strong brown rootstock. Later, as the fruit ripens and the plant dies to the ground this bud, white because deprived of sunlight, will have developed into two tiny leaves perfect in outline and venation; and surmounting them is a tiny flower bud with stamens plainly visible by means of a glass. All are protected by the bract covering noticed in early spring. Other plants make elaborate preparation for the next season, but so exquisite a plant in miniature the writer has never found elsewhere.

EPIPHYTES.

Epiphytes have been defined as plants which live or grow upon other plants without deriving their sustenance from them, and thus they can be readily distinguished from parasites, which absorb their nutriment direct from their hosts. It is much more difficult to draw a line of demarcation between epiphites and terrestrial plants for the latter are sometimes found growing in accumulations of decaying vegetable matter upon trees, and some plants seem almost independent of station if other conditions are suitable. There are, however, many plants whose sole habitat seems to be the bark of trees, and others which are rarely found except in accumulations of decaying vegetation in forks of the branches and crevices of the trunks, and to these the name epiphytes is applicable. One usually thinks of orchids in this connection, but there are many other orders which contain epiphytic representatives, while many orchids are purely terrestrial.

Puutting aside the lower cryptogams, among which epiphytes

are numerous, we find that the genus *Lycopodium* is largely epiphytic throughout the tropics. Among ferns several genera are largely epiphytic. Bromeliaceæ is a large Tropical American order containing many epiphytic representatives. Aroideæ also contains many epiphytes, while among orchids we find that a large proportion of the tribes Epidendreæ and Vandeæ belong to this class, in fact they are found almost throughout the tropics where the conditions are favorable. Among dicotyledons we find numerous epiphytes among Piperaceæ, Urticaceæ (*Ficus* and *Dorstenia*), various cactid, begonias, several genera of Melastomaceæ many Vacciniaceæ, some rhododendrons among the Eriaceæ, numerous Gesneraceæ and Rubiaceæ (the *Myrmecondia* group among the latter being specially note-worthy), and a few representatives of several other orders.

Although there are many plants whose sole habitat is the bark of trees, the dead bark does not always form the base from which their nutriment is derived. The trees often only serve as supports by means of which the plants raise themselves out of darkness into light. Such plants grow from stem or branches and send down absorptive roots into the soil, some of these roots being of enormous length. Here then is another difficulty in defining the term epiphyte, for these plants are closely analagous to climbing lianas, the difference being that the climber has its anchorage in the soil of the forest floor, and climbs up into the sun and light by means of any support that presents itself, while the other class germinates on the branches, and sends down roots to the soil in search of food.

Many plants might be termed pseudo-epiphytes, for they grow in accumulations of decaying vegetable matter, regardless of situation if the other conditions are favorable. As time goes on particles of inorganic dust collect in the forks of the branches and rents and fissures of the bark of old trees, and these, get mixed with fallen leaves and twigs and particles of crumbled bark, forming a vegetable mould which is an excellent soil for a large number of plants. So much is this the case that plants which are

normally terrestrial are often found in such situations. It has been well said that Nature has very few unoccupied places, and these plants have established themselves there because the conditions are favorable.

The plants which we are particularly speaking of are largely tropical and sub-tropical. In cold regions the plants that grow in the mould of the bark are for the most part mosses, liverworts and lichens, but in the tropics such situations form the rallying ground for a host of ferns and flowering plants. Small ferns are so numerous as to wreath the trunks, and with these are found Aroideæ, Orchids, Bromeliads, etc. It has been remarked that the Bromeliads chiefly ornament the forks of the trunks, while Orchids, Dorstenieæ and the various species of *Rhipsalis* grow on the upper surfaces of branches that ramify horizontally, while Aroidæ and begonias take root for the most part on the surfaces of high erect trunks.

The bark itself, that is the cortical layer, dead, but not yet crumbled and mouldered into dust, forms a nutriment substratum for a series of plants of various affinity—lichens, fungi, mosses, and higher plants. Even in the case of tropical orchids growing on a substratum of bark, if the roots are forcibly detached, little fragments of the bark will be found torn off with the rhizoids at the places where they issue from the stems. The majority no doubt nestle in the mould-filled crevices in the bark, and nourish themselves, besides, by means of special aerial roots which hang down in white ropes and threads, like a mane, from the places where the plants are situated. Some of these roots are flattened, and adhere firmly to the bark with their flat surface, like the roots of *Phalænopsis Schilleriana,* and on the under surface, behind the growing point, is a whitish fur, consisting of short, thickly packed, absorptive cells, and these adhere so tightly that it is often easier to detach small pieces of the bark than the root itself. Similar conditions have been observed in the roots of many other epiphytes. A curious fact has been observed in conection with these plants, namely, that when transferred to loose earth, devoid

of humus, they languish, because their roots are unable to enter into union with a support of such loose texture and this is true of most tropical Orchids that live upon bark. It has also been observed that the seeds of such orchids do not germinate on a loose substratum, but when on the bark of a tree they germinate, and develop into healthy plants.—*Orchid Review.*

A NEW BOTANICAL SOCIETY.

The wish often expressed by plant students that we might have a national botanical society democratic enough to admit to membership any who are interested in botany, is likely to soon be gratified. The preliminary steps have been taken toward the organization of such a society and if the enthusiasm of those who have already joined is any criterion, there will be a large number of members before the end of the year.

The new society will be called The American Botanical Club, and its object will be to further the study of plants in every way possible and especially by correspondence. The interests of the beginner will be looked after, and for those who desire it there will be abundant opportunities for exchanging seeds, living plants and herbarium specimens. A proper sentiment for plant protection will be fostered, and members will be aided and encouraged to cultivate the rarer species for study and observation. Specialists in various branches will name specimens for members, free. The crowning feature of the work will be the publication of the knowledge gained from these studies.

The constitution of the Club is being modeled after those which have made the Fern Chapter, and Moss Chapter so successful. The committee having this work in charge consists of Edward C. Jellett, Philadelphia, Pa.,, Chairman; J. C. Buchheister, New York, Secretary-Treasurer; Frank A. Suter, Lancaster, Pa., and Willard N. Clute, Binghamton, N. Y. Membership will be open to any botanist of good character, whether professional, amateur or beginner. Already the Club includes members of the Torrey

Botanical Club, Gray Botanical Chapter, Fern Chapter and several others.

Members will be kept informed of what is going on in the Club by a monthly bulletin free to members. This will doubtless contain various notes and observations by members. Longer articles will probably be published in the *American Botanist.*

The charter will remain open until August 16th, and every flower-lover who reads this notice is cordially invited to become one of the charter members. The dues for the first year will be twenty-five cents, and those who wish to join should send this amount with their name and address to Mr. J. C. Buchheister, whose address until the charter closes will be Griffin's Corners, Delaware County, N. Y. After August 16th application for membership should be made to the officers whose names will be announced later.

THE GINSENG HUNTER.

It is back in the hills, far from the madding trolley gong, that you meet now and then a ginseng hunter. It may be he sees you stoop to a plant, and a fellow-feeling prompts him to acquaintanceship; or perhaps he drops in upon you as you are weathering a shower in some wayside shack, and fellowship in adversity, makes, for the nonce, of you twain one. Not that he divulges at once the fact of his vocation; by no means, for ginseng is the most select of roots, and sells dried for about $3 a pound. He tests you in half a dozen ways, as a trout a suspicious worm, before, assured of your trustworthiness, he shows you one of the precious forked roots, and bites into it for love of its warm, spicy flavor. Like poet and fisherman, the ginseng hunter is born, not made. At his best he is kin to Thoreau's famous visiter at Walden Pond—that true Homeric or Paphlagonian man. He loves the wild life of outdoors for its own wild sake, and all elemental things—the sunshine, and the wind, the low flying mist, even a dash of rain; uncultured though he be, there is that in him which responds blindly to the solemnities of

the still deep woods, where the rare plant of his seeking spreads its palmate leaves and nurses its family of small red berries. With the ginseng of the books he has no acquaintance; what he knows is "ginshang," but this so familiarly that he has even verbalized it, and speaks of its quest as "goin' ginshangin'." He will spend days in contented search for it, faring dinnerless if need be, and sleeping out in the open, until his pockets, packed and bulging, he returns to his home, lays his spoil on the garret floor to dry and takes up again the thread of his village life. As other men go fishing, he goes "ginshanging."—*C. F. Saunders in Philadelphia Record.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

ORIGIN OF THE NAME "BUCKTHORN."—According to *Meehan's Monthly* the word buckthorn, was orginally box-thorn.

THE SENSITIVE PLANT AND ETHER.—It is stated that a sensitive plant placed under a bell glass with a sponge soaked in ether promptly goes to sleep just as an animal would under the same circumstances.

A BOTANIST DEFINED.—According to a South African journal "A botanist is a scientific man who has had a university education; he is very seldom a good amateur gardener; his time is mostly occupied with plant mummies, and is a most useful man to the gardener and nurseryman in giving names to plants, and to the State in settling all questions of plant life."

DEATH OF WM. H. MCDONALD.—Wm.H. McDonald, General Secretary of the Gray Memorial Botanical Chapter, was struck by a train at Elizabeth, N. J., on June 12th and instantly killed. Mr. McDonald was a most enthusiastic botanist and did much to build up the society of which he was the secretary. His loss will be felt by a large number of correspondents.

ORRIS ROOT.—It will probably be new to many to learn that the "orris root" of commerce is the rootstock of an iris (*I. Florentilna* The plant is easily cultivated in the garden and is frequently planted for the flowers of lavender and white.

THE SHASTA DAISY.—One of the best illustrations of what can be done by careful breeding of plants is found in the shasta daisy which is now attracting the attention of gardeners. The flower which is much like the common daisy in general appearance is stated to be often twelve inches in circumference, with three or more rows of pure white rays. These flowers have been produced by crossing the common daisy with European and Japanese species. When the proper strain was produced, careful selection did the rest.

SENTIMENT AND PLANT PROTECTION.—A circular recently sent out by one of our societies for plant protection speaks of "the sanctity of plant life." Such sentiments may be all very well when some beautiful orchid is in mind, but if the society really wants to make itself solid with our agricultural population, it had better cease operations on this line and make application at once for a permanent injunction against the Canada thistle, ox-eye daisy, quack grass and various others of the vagabond brotherhood.

THE SOUTHERN DANDELION.—I must tell you the dandelion is to be found in Florida but it is in miniature. You would perhaps have to put on your "specs" to see it. The blossom is less than one-half inch across as I have found them. Wish I could have had you with me in the depths of a hammock in Florida where the sword ferns (*Nephrolepis*) of several varieties we growing with a wealth and luxuriance that was marvelous.—*J. Yates Peck, Hudson, N. Y.* (Probably the Florida dandelion found by our correspondent is the little *Adopogon* which occasionally gets as far north as New York.—Ed.)

COMPOSITION OF PLANTS.—The whole realm of organic things contains practically only four substances—carbon, oxygen hydro-

gen and nitrogen. The myriad and bewildering variety of organic products, the substances of our bodies, the odors of the rose, the leaves of the forest, the appeasing delicacy of fruits, seem no more than these four substances put together in differing ways. Nay, analysis shows that the most astonishing variety of things can be made up of identically the same number of atoms of each element. Starch and cotton, to take a striking example are made up of the same proportions of the four organic elements.—*Harper's Magazine.*

Common Names of Erythronium.—When all the facts are summed up, it will probably be found that the spring flowers have the greatest number of common names for the reason that the great mass of the people are more often attracted by these early flowers. The yellow adderstongue has its share of these common appellations from "Trout lily" proposed by Burroughs to that of dog tooth violet known to everybody. A writer in *Success with Flowers* speaks of the flowers as "fish-hooks" and in Pennsylvania they are occasionally called "yellow hookers." It would be interesting to know how the idea of a hook has been connected with this plant.

Host Plants of the Dodder.—Here at home I have a "wild garden, "partly for amusement and partly for experimenting in so far as to find out if some of our wildlings may successfully be transplanted. Among these latter are several species of golden-rod and the dodder (*Cuscuta gronovii*) runs riot among all the plants, but never a single golden-rod is chosen as host. Its predeliction seems to be the Jewel weed (*Impatiens*) and any or all the *Eupatoriums.* Some seasons I find the nettle also embraced, but not always; why not, I have not been able, so far, to determine. *Cuscuta arvensis* and *C. polygonorum* seem to love the clovers and other low growing field crops, such as our common flax, and makes trouble in harvest time.—*Max E. Munte.*

Use of Ether in Forcing Flowers.—The forcing process, by which the florists are able to give us flowers of various kinds much earlier than they would naturally bloom, has recently been revolu-

tionized by a remarkable discovery in the use of ether. The dormant condition of plant life in winter is roughly analogous to the sleep of animal life and the florist simply wakes the plants up ahead of time. The plants, however, if awakened too soo do not readily take up active life again as many have found who have tried to force any of our native flowers at Christmas time though they bloom freely enough a month or so later when they have finished their naps. The use of ether in the forcing process seems to put the plants to sleep not only earlier but so soundly that they are soon ready for another season of growth. If a quantity of ether be liberated beneath the branches of a bush or shrub in July or August, the leaves will at once wither and fall, exactly as they do in autumn and the plants will soon be ready to bloom again. In the usual practice the plants to be forcd are placed in airtight boxes when being subjected to etherization. Fifty-four hours of this treatment is sufficient and the plants may then be placed in a hothouse and treated as ordinary plants are. The important point is that these etherized plants developed so rapidly that they are in bloom before the buds have begun to swell on plants of the same species not treated thus. Twelve days of forcing has brought some of these etherized plants into full flower.

Origin of Potatoes.—If botany was not so serious a business, the facetitiously inclined might be led to remark in view of the many offices that bacteria are found to have in the roots of plants, that bacteriology is rather being run into the ground. One after another, certain ferns, palms, pines, heaths and others have been found depending upon these minute underground organisms, much to the surprise of us all. But close after these discoveries comes one still more surprising to the effect that the common white or Irish potato is also due to the agency of bacteria. It may be said that this, as yet, can scarcely be regarded as absolutely certain, but all the evidence points in that direction. The plant is a member of the nightshade family and like the other species able to reproduce itself by seeds. Then why these vegetative bodies in the earth? It is also pointed out that potatoes are not produced

as soon as the plant commences to grow, and that when they are, they are formed of what are regarded as arrested branches—somewhat analogous to the way in which the "apples" are formed on the Azalea. Other nightshades have not the tuber-bearing habit. If the potato is likely to be due to a specific microbe, then almost certainly the tubers of the ground nut (*Apios tuberosa*) must be placed in the same class, and probably the artichoke (*Helianthus*) also.

THE POISONOUS PRINCIPLE IN RHUS.—Several attempts have been made to isolate the poisonous principle of the poison ivy (*Rhus toxicodendron*) and poison sumac (*R. venenata*) and the resultant failures have given ground for the belief that it is a volatile substance difficult to secure. Later, an experimenter attributed the poisoning to a volatile acid which he named toxicodendric acid. Still later researches go to prove that the real poison is an oil which is known as "toxicodendrol." The oil is found in all parts of the plants and at all seasons of the year. Even the hairs of the leaves under the microscope may be seen to contain oil. The popular idea that the plant is most poisonous when in bloom may thus possibly have some foundation in fact, as the pollen might be carried for some distance by the wind. It is difficult in this case, however, to understand why the nose and throat are not more frequently affected. Toxicodendrol is insoluble in water, but readily dissolves in alcohol, ether, chloroform, etc. It is poisonous in the minutest quantities. In one instance the one-thousandth part of a millegram in two drops of olive oil was effective. The oil is not volatile. The time necessary for it to take effect after reaching the skin, varies from 18 hours to nine days. As the oil forms a nearly insoluable precipitate with lead acetate, the best remedy is seen to be the well known one of washing the affected parts with an alcoholic solution of lead acetate. The article from which these facts are drawn was published in *Rhodora* for March.

EDITORIAL.

That anyone is content to rest after merely learning the names of the flowers, is not much to his credit, and if after learning these names, he turns his attention to the petty differences between tweedledee and tweedledum that bother our namenclaturists, he will be in a scarcely more enviable position. The greatest and most enduring pleasures to be derived from an acquaintance with plants is, without question to be found in studying them as living things; in observing their development from day to day, from the expanding leaf and unfolding flower through all the life of processes to the ripening seed. In fact this is the one phase of botany that increases in interest the longer we study it. There are many among us wise in the lore of plants but not one that knows all that may be known of even the commonest species. One needs no great library or extensive herbarium, for such studies. The woods and fields will be his work-shop or if bricks and mortar keep him from this the back-yard in the town, or the window ledge in the city will be large enough to contain the materials for his work. The AMERICAN BOTANIST was founded for the encouragement of studies of this kind, and all the matter that has gone into it has been selected with the idea of furnishing information of value of the student. In a journal of such character, it is manifestly impossible to publish all original matter, for no single publication can expect to "corner" the stock of interesting notes or bright ideas and we venture to assert that in thus giving a review of all other botanical publications, we have not only made two volumes that will remain of pertinent interest and value but two which will compare very favorably with much more pretentious magazines.

Some time ago we promised that as soon as our circulation warranted the magazine would be increased in size. We now take pleasure in announcing that every number of Volume III. will contain twenty pages. How soon we shall again increase the size depends entirely upon our subscribers. Each one is vir-

tually a stockholder in the magazine and while he is not repaid in money for his assistance in advancing its interests, the dividends he receives in the way of a larger number of pages should be equally satisfactory. On another page we offer two subscriptions for $1.40. This is practically offering to pay sixty cents for a single subscription. In renewing be sure to send one new subscriber and thus get your copy for forty cents.

One of the important features of the forthcoming volume, will be a series of keys, based upon color for the identification of the wild-flowers, the first of which is expected to appear in the July number. These keys will be illustrated by drawings of the flowers named, and arranged much as are the keys for identifying the ferns in the editor's "Our Ferns in their Haunts." The reprinting of interesting notes and articles from other publications will be continued and readers are assured that by subscribing to the AMERICAN BOTANIST they will miss nothing but the technical papers in other journals. At the same time we desire to state, that the extra pages we are adding will be devoted to original articles and we request contributions within our scope from all our readers. The use of illustrations when desirable will make the new volume of still greater utility.

BOOKS AND WRITERS.

The *Junior Naturalist,* a publication "devoted primarily to the young naturalist," is announced to begin publication in August, at Chicago.

Time was when the flower lover was perplexed to know where to find a book to identify his finds; now his perplexity arises in trying to select the best one from the growing number of popular botanical works. The botanizer who can afford it will have them all; others can get along very well with a smaller number. While all these "popular botanies" have for their aim the introduction of the plant world to the nature lover, their different ways of ap-

proaching the subject leave wide scope for individual choice in the matter of a hand-book. F. Schuyler Matthews' "Field-book of American Wild Flowers," has to recommend it, the fact that it is small enough to slip into the pocket although it illustrates nearly 200 of our native wild flowers and describes several times as many in a way that enables the average botanizer to pick out his plant at once. There are 24 colored plates and the others face the descriptions of the plants which they illustrate. The families are arranged in the Engler-Prantl sequence, and the descriptions pay especial attention to the time of blooming, the color of the flowers, and the insect which assist in cross-pollenating them. Mr. Matthews' artistic instincts will not let him agree with the prevailing ideas of color and he says "In botanical and ornithological works we find such color names as fuscous, rufous, vinaceous, ferrugineous, rose-purple, greenish-purple, etc." They mean nothing to one who is not a scientist and I half suspect they mean little to one who is. Purple (botanically speaking) is a dreadfully abused term which is made to stand for half the rainbow. As an actual fact it is fairly represented by *Mimulus ringens* and one jot to the right or left of that line is *not* purple. Pure yellow is perfectly represented by *Oenothera biennis*. Blue in its pure form only exists (dilutely) in *Myostis*." Readers may therefore expect to find new but more correct and definite color names given to even well-known blossoms. As to nomenclature, he says: "From what I know of the so-called Rochester code, I should say it is a disturbing influence among already agitated conditions and its lack of consistency does not entitle it to unreserved acceptance." The book has a great advantage over others of its class in its portability. The illustrations are very characteristic but it seems to the reviewer, that reference to the book would have been much facilitated by a simple key to the species. The book is published by G. P. Putnam's Sons, New York, at $1.85.

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How to Know the Wildflowers. Dana (2.00)	2.50
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